IS standards in designing business-to-government collaborations

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The case of customs

PROEFSCHRIFT

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List of Abbreviations and Acronyms

AAD	Administrative Accompanying Document
ACORD	Association for Cooperative Operations Research and Development
AEO	Authorized Economic Operators
AES	Automated Export System
AFII	Analytical Framework II
AIAG	Automotive Industry Action Group
AIS	Automated Import System
AIN	Aangifte informatie
ANSI X12	Data Transfer Standards issued by the American National Standards Institute Accredited Standards Committee X12
ANSI	American National Standards Institute
ATG	Applied Technologies Group of UN/CEFACT
ATM	Automated Teller Machine
B	Business domain underneath the AFII
B2B	Business-to-Business
B2G	Business-to-Government
B2GPM	Business-to-Government Procedure Model
BITNET	Because IT's Time NETwork
BMA	Business Message Assembly
BO	Business Organization
BOs	Business Organizations
BOP	Business Organizational Population
BOPs	Business Organizational Populations
BPEL	Business Process Execution Language
BPEL4People	Business Process Execution Language for People
BPMLM	Business Process Management Lifecycle Model
BPMN	Business Process Modeling Notation
CAP	Common Agricultural Policy
CC	Customs Code
CCIP	Common Customs Information Portals
CCL	Core Component Library
CCL08	Core Component Library Version issued in 2008
CCTS	Core Component Technical Specification
CDM	Context Driver Methodology
CDT	Core Data Type
CEN	European Committee for Standardization Organizations
CIDX	Chemical Industry Data Exchange
CIM	Computer Integrated Manufacturing
cXML	Commerce XML
COM	legal Communication communiqué
C-TPAT	Customs-Trade Partnership Against Terrorism
DG	Directorate General
DK	Denmark
DTCA	Dutch Tax and Customs Administration
EAD	Export Accompanying Document
EAN	International Article Number
ebXML	Electronic Business Extensible Markup Language
e-Commerce	electronic Commerce

e-Customs	electronic Customs
e-Gov	electronic Government
EDI	Electronic Data Interchange
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange for Administration Commerce and Transport
EDIFOR	Electronic Data Interchange FORwarding Subsets
EEC	European Economic Commission
EMCS	Excise Movement and Control System
EPCglobal	Electronic Product Code global
EPCIS	EPC Information Services
ERP	Enterprise Resource Planning
EU	European Union
EUR-LEX	Online library of European Legislation
EVO	Dutch Shippers Council
FI	Finland
FIPS	Federal Information Processing Standards
G	Government domain underneath the AFII
G2B	Government-to-business
G2C	Government-to-citizen
G2G	Government-to-government
GO	Governmental Organization
GOs	Governmental Organizations
GOP	Governmental Organizational Population
GOPs	Governmental Organizational Populations
GOST	Certificate issued by the GOSSTANDART, the Russian Standards Institute
GS1	Global Standards One
HL7	Health Level 7
HTML	HyperText Markup Language
http	Hypertext Transfer Protocol
ICT	Information and Communication Technology
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IGO	Inter-Governmental Organization
IGOP	Inter-Governmental Organizational Population
IOS	Inter-Organizational Systems
IOTP	Internet Open Trading Protocol
IRU	International Road Transport Union
IS	Information System
ISO	International Standard Organization
IT	Information Technology
ITAIDE	Information Technology for Adoption and Intelligent Design for e-Government
ITE	Integrated Tariff Environment
JSR265	Application Programming Interface for Utilizing Web Services Policy
JTC	Joint Technology Committee
JTC1	Information Technology Standards
LG	Legal Group of UN/CEFACT
LSP	Logistics Service Provider

MASP	Multi-Annual Strategic Plan
MCC	Modernized Customs Code
MIS	Management Information System
MISMO	Mortgage Industry Standards Maintenance Organization
MRN	Movement Reference Number
MS	Member States of the European Union
NCTS	New Computerized Transit System
NCTS-TIR	New Computerized Transit System applying the International Road Transport Convention for Transit
NDR	Naming Design Rules
NGO	Non-Governmental Organization
NII	Non-Intrusive Inspection
NIST	National Institute of Standards and Technology
NL	The Netherlands
O	Organization
Os	Organzations
OAGIS	Open Application Group Integration Specification
OASIS	Organization for the Advancement of Structured Information Standards
OCF	Open Catalog Format
ODETTE	Standard issued by the Association of Automotive Industry Groups
ODP	Open Development Process
OF	Organizational Field
OJ	Official Journal
OP	Organizational Population
OPs	Organizational Populations
OU	Organizational Unit or Subsystem
OUs	Organizational Units or Subsystems
OWL	Web Ontology Language
papiNet	Global transaction standard for the paper and forest supply chain
PFIRES	Policy Framework for Interpreting Risk in e-Commerce Security
PL	Poland
POWER	Project name of the project for legislation modeling issued by DTCA
PSI	Pre-Shipment Inspection
RDF	Resource Description Framework
REALM	Regulations Expressed as Logical Models
RETML	Real Estate Transaction Markup Language
RMF	Risk Management Framework
S	Society
SAD	Single Administrative Document
SAD	Single Administrative Document
SAFE	Framework of Standards to Secure and Facilitate Global Trade
SBDH	Standard Business Document Header
SC	Sub-Committee
SC36	Sub-Committee 36
SCA	Software Communications Architecture
SDO	Standard Development Organization
SE	Sweden
SEAP	Single Electronic Access Point
SEC	Section in legal acts or regulations

SEED	Systems for Exchange of Excise Data
SGML	Standard Generalized Markup Language
SMART	Document standard underneath MISMO
SME	Small and Medium sized Enterprise
SMTP	Simple Mail Transfer Protocol
SOAP	Simple Object Access Protocol
SQL	Structured Query Language
SW	Single Window
SWA	Single Window Access
TAXUD	Taxation and Customs Union Directorate General
TBG	International Trade and Business Processes Group of UN/CEFACT
TBT	Technical Barriers to Trade
TCO	Total-Cost-of-Ownership
TIR	International Road Transport Convention for Transit
TMG	Techniques and Methodologies Group of UN/CEFACT
U.S.	United States
U.S.A.	United States of America
UDDI	Universal Description Discovery and Integration
UML	Unified Modeling Language
UMM	UN/CEFACT Modeling Methodology
UN	United Nations
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNECE	United Nations Economic Commission for Europe
VAT	Value Added Tax
VIES	VAT Information Exchange System
W3C	World Wide Web Consortium
WCO	World Customs Organization
WP	Work Package
WS	Web Services
WSDL	Web Services Description Language
WTO	World Trade Organization
XML	Extensible Markup Language
XPDL	XML Process Description Language
XÖV	XML in der Öffentlichen Verwaltung

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Summary

Along the trajectory of EDI, collaborating business partners discovered the benefit of information systems (IS) standards. Inter-organizational studies demonstrated a standard's positive impact on the collaboration between governmental and business partners. Studies focused mainly on catalogue data exchange, electronic procurement, and the emerging field of legal impacts on IS engineering. Following the trace of global trade business-to-government (B2G) collaborations, the European Union promotes collaboration in customs-relevant legislation as 'key instrument to foster co-ordination between all the stakeholders' (European Commission (2007a), p. 4). Leveraging the role of IS, the European Union adapted legislation to incorporate information technology as a facilitator of multi-stakeholder co-ordination (European Commission (2007a), p. 13).

This research aims to extend research on further implications of IS standards on B2G collaborations. It identifies and designs building blocks of B2G interactions such as actor types, linkages, and determinants of successfully conducted B2G collaboration. The research was carried out along a longitudinal case study in the context of a European research project that investigates the role of 'Information Technology for Adoption and Intelligent Design for e-Government' (ITAIDE). The study covers institutional elements and the composition of B2G collaborations between tax and customs authorities, standardization bodies, and academic institutions in three B2G networks and lasted for three years. In addition to the collaboration studies, the research included the study of customs-related legislation.

The results of the research are documented and composed in a model, the B2G Procedure Model (B2GPM). The institutional characteristics of a collaboration as depicted by Scott (2001), and further building blocks of a B2G collaboration are the baseline for the model. With the B2GPM, the textual descriptions of Scott's approach are accessible in a structured and comprehensive manner. Moreover, the B2GPM bears in mind that every organization is part of a network interacting with a changing number of organizations from a business and governmental perspective. Built on the institutional aspects of inter-organizational cooperation, the dissertation reflects upon regulatory ties that link business and governmental partners. IS standards are one medium type that facilitates the transport of content such as regulations and customs-relevant procedures from governmental to business partners and vice versa. Collaboration is being established once collaboration partners initiate the institutionalization of cooperation. They accept and adopt the building blocks as described in the B2GPM. Then, organizations start to accommodate themselves to institutional behavior. The evaluation of the B2GPM took place in evaluation phases

and included the comparison of the B2GPM modeling guidelines with other design guidelines and the application of the model in a non-European customs case, the case of Ghana. Next to the theoretical implications on the institutional aspects of IS standards research, the dissertation contributes to the practical need of organizations to find a systematic approach in entering foreign markets and ensuring regulatory compliance end-to-end.

The dissertation offers to the IS research community a novel approach by the design, construction, and provision of an institution-based and standard-enabled procedure model, the B2GPM. The adoption of the B2GPM will depend on organizational and network characteristics. The study of B2G collaborations revealed a high connectivity between an organization and the network or networks the organization belongs to. Intra-organizational characteristics such as an organization's strategy to strengthen the economic growth and entering foreign markets, the social and networking skills of employees, as well as the cultivated IS legacy steer the adoption not only by the organization but also by its employees. An organization then carries the decision to adopt to other participants in the network. Still, a stakeholder-type-centric or single-stakeholder-based adoption is insufficient for stimulating the entire network to adopt the model. Governmental actors need to become involved in the adoption process.

1 Introduction

Along the trajectory of EDI, collaborating business partners discovered the benefit of Information Systems (IS) standards. Inter-organizational studies demonstrated a standard's positive impact on collaborating partners. The growing formation and institutionalization of standard development organizations (SDOs) responded mainly to the emerging needs of industry focused networks. SDOs offer to-date standards for data, messaging, and business process exchange. Despite the fact that SDOs ease the pace of inter-organizational collaboration and lead to economic and network effects, their focus are business-to-business interactions (B2B) and promote the role of standards in industry specific B2B collaboration.

Literature covers IS-fostered interrelatedness between business and governmental partners mainly on catalogue data exchange, electronic procurement level, and the emerging field of legal impacts on IS engineering. With respect to European trade, trade legislation issued by the European Union and non-governmental guidelines such as the Revised Kyoto Convention promote trust and secure electronic collaboration between business and governmental actors for export, import, and further transactions. The European Union Customs Code promotes collaboration in legal texts and sees herself as "key instrument to foster co-ordination between all the stakeholders" (European Commission (2007a), p. 4). With respect to the role of IT, the European Union adapted legislation to incorporate IT as vehicle to facilitate multi-stakeholder co-ordination (cf. European Commission (2004), p. 13).

This research aims to identify and design IS standards as one of other building blocks of business-to-government (B2G) interactions. It aims to identify actor types and roles, linkages that connect actors, and further determinants of successfully conducted B2G. This work proposes the use of IS standards to make B2G collaborations work. Once successfully implemented, B2G elements allow business actors to invite to-date unknown business partners into their network much more easily than in traditional, proprietary standards based networks.

Current B2G collaborations are characterized by inefficiencies in customs management. Organizations interact with a changing number of organizations from business and government. The influence of institutional constructs such as legislation and governmental actors in customs activities is high. Hereby, IT-driven customs management is perceived to be a benefit to B2G collaborations. Organizations would expect the inclusion of institutional elements of inter-organizational cooperation such as regulations and customs driven processes in B2G-relevant interactions.

1.1 Background and Problem Definition

European trade activities are dependent on a number of influencing factors. They range from regulations issued on national, international, and global levels. On supranational level, the European Union issues regulations that become transposed to national European member states (cf. European Commission (2004), p. 11). On global level, trade activities embrace for example the Revised Kyoto Convention (cf. WCO (2000), p. 4; WCO (2004), p. 80; WCO (2006a), p.5) and the Agreement on Technical Barriers to Trade (cf. ISEAL (2006), WTO (1986-1994)). To provide a clearer picture on the scope of multi-layered arrangements concerning EU trade regulations and directives, Panagariya (cf. Panagariya (2002), p. 1416-1418) proposes the following. He distinguishes seven layers that address trade arrangements issued by the European Community, namely the (1) European Union, (2) the European Economic Area, (3) the Customs Union, (4) Free Trade Areas, (5) Mediterranean Partnerships, (6) ACP Preferences, and (7) the Generalized System of Preferences. Each of the layers is now briefly introduced. (1) In the layer of the European Union, the EU member states issue common external tariff and common basic rules, common agricultural policy, competition policy and common basic rules governing movement of goods, services, capital and persons. (2) The European Economic Area refers to the Single Market of the EU and extends it to three out of four European Free Trade Areas, including Norway, Iceland, and Liechtenstein. (3) The EU Customs Union regulates the transposition of supranational to national law in the Common Commercial Policy in Article 133 of the European Community Treaty (cf. European Commission (2009), p. 51-53). (4) Trade arrangements are set in place by the European Union with Free Trade Areas. (5) In case of Mediterranean Partnership, the implementation of the Euro-Mediterranean free trade area with 12 partner countries is expected to be implemented by 2010. (6) The one-way trade preferences with African, Caribbean and Pacific (ACP) regions cover seventy-one countries. (7) In addition and in accordance with the WTO, the European Union covers further trade preferences. Regardless the focus of actors that participate in the above-outlined layers, trade facilitation policies are being detailed, discussed, administered, issued, and connected (cf. The World Bank Group (2004), p. 9). Within that web of policies, the management of inter-organizational collaboration gains complexity.

To fulfill the basic principle of trade, the movement of goods from a seller to a buyer, trade facilitation processes started over 5000 years ago with the trade of natural ingredients (cf. Schware & Kimberley (1995), p. 2-3). Since then, trade facilitation processes expanded and include export, import, and transit processes, tax, security, governance, among further topics. Depending on the nature of an agreement, as for example one-way trade agreements, the details in performing export from the EU is

steered one-way by the issuing party, the EU, but does not necessarily become accepted or transposed by the importing party (cf. The World Bank Group (2005), p. 156). In the field of export, customs management is a critical element to enable trade facilitation in developed, emerging and developing markets (cf. The World Bank Group (2004), p. 9). Actors that participate in customs management are declarants, manufacturers, exporters, freight forwarders, warehouse keepers, customs agents, carriers, and importers (cf. European Commission (2007e), p. 8). Figure 1.1 captures one of many possible illustrations of the proposed trade agreement framework and sets it into context with tasks that become managed: customs, security, tax, control, privacy, and risk related tasks.

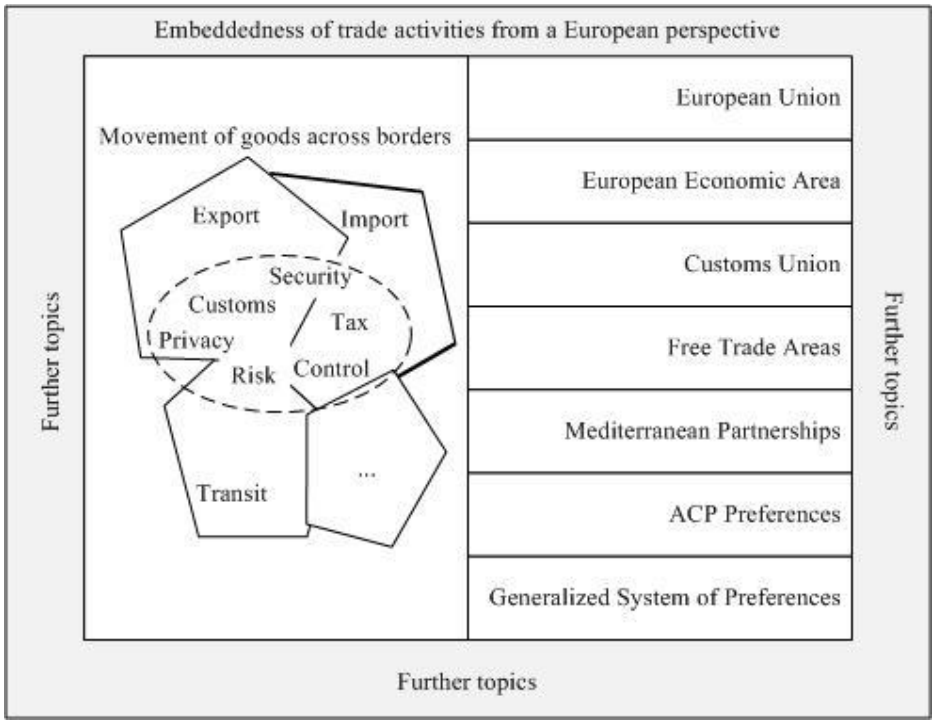


Figure 1.1: A simplified structure of the European trade facilitation framework

At this stage, further references point to trade agreements and the present progress on the European level, namely from a European (cf. European Commission (2005d, 2007, 2008)) and a WTO perspective (cf. WTO (1986-1994)). One example on the EU national level is the customs handbook issued by the German government (cf. TAXUD (2004)). Herein, customs management details vary from country to country due to the different focus on customs administration tasks (cf. Widdowson (2007), p. 31). Within the above-outlined agreement layers, the movement of goods across borders embraces export, import, and transit management among further tasks (ibid., p. 31-32). Dependent on bilateral and one-way trade agreements the shape of these topics differs from country

to country. Customs, security, tax, and risk governance activities are apparent in these activities. The level of control and privacy measures does also depend on the individual agreements with the trading parties and local and foreign regulations and habits. Thus, the counterparts across the border are counting in the cross-border collaboration. Under the lens of export, counterparts that become involved are for example declarants, manufacturers, exporters, freight forwarders, warehouse keepers, customs agents, carriers, and importers. According to the World Customs Organization (WCO), customs-business partnerships should comply with WCO or equivalent supply chain specific security standards (cf. WCO (2004), p. 13). Those result from an increasing necessity in securing trade movements and endorsing various types of actors. Business partners, customs, and tax authorities are confronted with regulatory and technically safeguarding measures that affect business-to-government interactions. One of which is the plan to deploy a number of B2G relevant software applications (cf. European Commission (2006c), p. 22-23). Having issued scope and deployment details to EU member states, references to IS implementation, architectural and standardization specific requirements or recommendations are not yet provided.

Turning the focus on IS research in B2G collaborations, a survey of articles concludes that information technology in B2G collaborations is mostly looked at as a tool enabler and that governmental actors drive regulatory requirements for collaborations but do not appear as active participant (cf. Andersen & Henriksen (2005); Danziger & Andersen (2002)). Recent studies emphasize the importance of the governmental participation in electronic government studies or IS studies (cf. Heeks (1999); Scholl (2005); Tan, Klein, Rukanova, Higgins, & Baida (2006); The World Bank Group (2004), p. 142, 171, 281). Some issues that result from the missing element of customs in case studies are the followings (cf. McMaster & Nowak (2006), p. 2-3):

- Concepts in theory and practice describe business networks with differing roles, responsibilities, and scope of interaction
- Legislation that reflects customs matters is being issued by international, supranational, and national authorities
- Recommendations and guidelines that refer to customs matters are being issued by non-governmental organizations
- Misalignment of the provision of information to different governmental units or agencies

- Increasing amplitude of commercial and logistics details required for information exchange
- Misaligned approval and control procedures among participants that complicate the movements of goods
- Inter-organizational standards are mainly proposed by industry-led Standard Development Organizations (SDOs) or non-governmental institutions
- Process models that point to inter-organizational collaborations derived from B2B activities.

Business and governmental actors are being asked to deal with above-outlined offerings and decide upon a potential fit and implementation efforts to be made. The offerings differ in or lack technical specifications. They do not include B2G collaboration guidelines that outline the design and construction of B2G collaboration and software applications. Missing details lead to unnecessary coordination and deployment efforts on business and governmental sites. The use of IS in B2G requires a broader approach by which the Organization for Economic Co-Operation and Development (OECD) claims technology neutrality and flexibility within regulatory frameworks, the alignment of performance requirements and technical specifications, and an involvement of all stakeholders in regulatory processes to foster international collaborations and resolve cross-border issues (cf. Lau (2003), p. 2). Under the lens of customs, the two challenges in B2G collaboration are the following:

1) To fulfill customs related regulatory requirements in both the home and foreign trade regions and

2) To participate in customs management with least efforts involved

The challenges require a choreographed institutionalization of the collaboration and a continued coordination. A choreographed and B2G focused composition of these offerings however does not exist so far. This requires that access to B2G collaboration is determined through regulatory compliance and is, unless regulatory compliance is not met, unlimited. Coordination needs arise from activities that embrace regulation updates, pre-formatting of legislation and public process models, as well as publishing these. Further coordination needs relate to the question of which organization is in charge of maintaining collaboration relevant tasks as for example activities that concern conformity assessment. An alignment with conformity assessment activities as conducted by the US Chamber of Commerce for example is highly recommended (cf.

U.S. Department of Commerce (2004)). The regulatory environment of customs reflects the institutional context of export and customs management in particular as well as the influence of institutional forces on business networks. On the one hand, business networks play a crucial role for individual actors to become more competitive and mitigate the risk of losing track of business opportunities (cf. Hess (2002), p. 7-9). On the other hand, collaboration on a global scale between disparate actor types cannot be achieved by depending on paper-based or non-interoperable data and transaction processing (cf. Pálfalvi, J. (2009), p. 5). Accordingly, the benefits of IT-enabled trade management can only be achieved when B2G networks and the inter-organizational structures are designed in accordance with actor types, actor roles, and institutional forces that affect each of the actor types.

1.2 Research Gaps, Objectives and Questions

Research on the role of IS standards in network formation evolves from distinct research disciplines. A summary of relevant research is provided in Table 1.1. One of the first prominent examples in inter-organizational research is EDI. Since the 1970s, EDI has been implemented by and adopted in a number of business networks. Along the trajectory of EDI, the number of inter-organizational studies on standard development (Table 1.1, a.) and on the impact of EDI in networks (Table 1.1, b.) increased. Relevant research shed light on the evolvement of diffusion potential of IS innovations (Table 1.1, d.). More recently the research interest in the diffusion of standards grows (Table 1.1, f.). Research investigates the economics of standards and the impact on transaction costs (Table 1.1, c.). The formation of actor networks and construction principles is subject to network theory (Table 1.1, e. and g.). With respect to governmental influence on collaboration activities, the discipline of new institutionalism (Table 1.1, h.) dedicates its research interest to institutional structures such as regulations, directives, and further formal ties that hold actors together.

Standards such as those for EDI grew into the role as collaboration enablers that stimulate inter-organizational dynamics. To which extent standardization organizations reflect the interest of international collaborators is subject of research reviews and studies (Fricke, Götze, Pols, & Renner (2006); Hofreiter & Huemer (2003); Mendoza, Ravichandran, & Jahng (2005); Nelson & Shaw (2005); Salazar (2005)). Standards become an essential building block in vertical, supply- and distribution chain concerned networks (cf. Nelson & Shaw (2005), p. 5; Kallioranta & Vlosky (2002), p. 1-2; Sissonen (2002), p. 41). As delineated in Table 1.1, these efforts eased the ground of commencing discussions and research on appropriate collaboration. On the one hand, offerings of standard development organizations (SDOs) demonstrate the usefulness of

standards in vertical, industry-centric networks, despite the numerous offering and the focus on industry specific needs (see Annex **Table A.9.5**). On the other hand, SDOs offer cross-industry process and message definitions. The numerous offering of process and message definitions issued to actors by sector-specific[1] SDOs are reusable in more than one industry. On the other hand, the offerings overlap and furthermore ask actors to decide upon which offering to use. Besides, multiple offerings might complicate data and message processing in collaboration scenarios in which actors participate in more than one industry. Not focused on one industry, the question raises by which organization(s) or actor(s) the conditional framework of export relevant collaboration are dictated (cf. European Commission (2007a), p. 4). Governmental actors are apparent sources of regulatory, thus de jure conditions. Non-governmental organizations (NGOs) as for example SDOs, the WTO and the WCO, propose de facto conditions such as trade agreements, security guidelines, and industry-specific logistics standards (cf. The World Bank (2005), p. 8)). These are to be met through governed guidelines and recommendations they issue to business and governmental actors. The interplay of de facto and de jure based conditions makes the role of governmental actors in B2G trade networks unclear. Focusing on governmental actors and in particular customs, their as any organization's role in an external environment such as in networks is determined by institutional factors (cf. Peteraf & Shanley (1997), p. 172-173). With respect to standards, the demand on standards' use is apparent in regulatory requirements and explicitly stated (cf. European Commission (2007a), p. 13). The impact of standards on inter-organizational constructs and their level of influence on institutionalization of collaboration types such as B2G form a major research gap and delineate a major challenge for practitioners and researchers.

[1] Sector-specific is referred to in this dissertation as the focus on one industry. The dissertation uses 'vertical' as a synonym for sector-specific.

Table 1.1: Relevant research disciplines to assess standards in B2G

Research disciplines	Relevance to research need	References
a. Standard development	Actors and activities involved in standard development Design of information systems based on user requirements and standardization needs	Löwer (2005) Markus, Majchrzak, and Gasser (2002)
b. EDI impact on B2B research	Adoption, diffusion, and intra-organizational impact of EDI Comparison of national and international EDI implementations Impact of EDI on industry driven B2B	Andersen et al. (2000) Bjørn-Andersen and Krcmar (1995) Teo et al. (1997) Zhu et al. (2006 Henriksen (2002) Buxmann et al. (2005) Iacovou et al. (1995)
c. Economics of Standards	Economic effects of standards Network effects on markets Benefits of standards Organizational perspective	Farrell and Saloner (1987) David and Greenstein (1990) Shapiro and Varian (1999)
d. Diffusion of Innovation	Diffusion of innovation Standards as innovation driver Organizational adoption Complex network adoption and organizational perspective	Rogers (1995) Thong (1999) Lyytinen and Damsgaard (2001) Hovav et al. (2004)
e. Cross-Organizational Network Organization	Inter-organizational business process management modeling Actor network relations and the influence on open innovation in networks Collective action by aligning interests and achieving the development of public goods in form of vertical standards	Samuelson (1954) Riemer and Klein (2006) Chesbrough (2003) Markus et al. (2006) Wigand et al. (2005)
f. Diffusion of Standards in Information Technology	Diffusion of standards Environmental and network related effects of standards Users in standardization organizations Distinguishing horizontal and vertical orientation of standards	Mendoza, Ravichandran, and Jahng (2005) Fomin, Keil and Lyytinen (2003) Damsgaard and Truex (2000) Kotinurmi et al. (2003) Nurmilaakso (2006)
g. Network formation	Network forms Measures evaluating network forms and usage	Brass 1995; Hess (2002) Riemer and Klein (2006)
h. New Institutionalism	Transformation from standards to rules or regulations (carriers, transmitters) Analytical Framework II Institutional aspects in standard development	Scott (1987, 1990, 2001, 2005, 2008) Brunsson and Jacobsson (2002) Damsgaard and Lyytinen (2001)

Research topics in IS research range from computer concepts, data concepts, software management concepts, organizational concepts to societal concepts of IS research (cf. Vessey, Ramesh, & Grass (2002), p. 48) (Table 1.2). Among these topics, organizational concepts distinguish structural, strategic, implementation and adoption relevant research questions (ibid.) (Table 1.2).

Table 1.2: IS Research topics and sub-topics

Source: cf. Vessey, Ramesh, & Grass (2002), p. 48 / Table 1c

Systems and software concepts	
	Software lifecycle engineering
	Product quality and performance
	Methods, process, data, and procedure models
Systems and software management concepts	
	Project management
	Measurement development and use
	Personnel issues
Organizational concepts	
	Organizational structure
	Strategy
	Organizational alignment
	Organizational learning
	Technology transfer
	Change management
	IT implementation
	IT usage
	Management of computing function
	Legal, ethical, political, and cultural implications
Societal concepts	
	Legal implications
Disciplinary issues	
	Computing research

Research questions that concern a legal impact on IS research are addressed in the fields of organizational concepts and legal concepts. The measurement of adoption and use are also allocated in IS research. Topics concern systems and software concepts as well as management concepts for systems and software, organizational aspects, societal issues, and disciplinary issues. Interestingly, the inclusion of societal concepts in IS research gives room for discussing and investigating triggers of standard development that point to legal, ethical, political, and cultural origin. As important as in societal concepts, legal

implications are notably included in organization-specific IS research and hereby strengthen the argument to assess legally imposed inter-organizational research from an IS research perspective. What is missing is the consideration of standardization as an independent IS research theme.

Reflecting on the background and problem definition of standard-enabled B2G collaboration, several scientific and practical research gaps have been identified. They form the motivation for this work:

(1) Practical research gap: Companies find it time and resource consuming in entering foreign markets and ensuring regulatory compliance end-to-end. In particular, small and medium-sized enterprises hesitate in pursuing new trade opportunities due to increasing demand in providing a number of data and documents to governmental authorities. A small and medium-sized enterprise is hereby defined as an "enterprise with fewer than 250 employees" (De Vries, Blind, Mangelsdorf, Verheul, & van der Zwan (2009), p. 10) Multi-national companies aim for pre-formatted and bundled transaction processing to streamline regional export activities and to avoid multiple data entries and validation. Customs organizations aim to fulfill regulatory requirements where needed and necessary. The growth in international trade asks for doable and standardized IT means that allow customs officers and service providers to interact and collaborate with the least paper-based and physical expense required. IT standards emerging from EDI influenced over the last decades the formation and maintenance of sector-specific, industry oriented networks (cf. European Commission (2005a)). Standards that succeed in the facilitation of inter-organizational B2G networks can play an imminent role for preparing an organization's readiness for electronic customs management. With respect to governmental authorities such as customs, they become an integral partner in business networks. The Modernized Customs Code for example attests that customs play "a leading role within the supply chain and, in their monitoring and management of international trade, making them a catalyst to the competitiveness of countries and companies" (European Commission (2004), p.4).

(2) Scientific research gap: Cross-organizational models that accommodate B2G collaboration forms are missing. It is questioned if and how a cross-organizational model for B2B becomes adapted to B2G or if a different approach needs to be taken. Scott's Analytical Framework II (AF II) raises the appropriateness of standards as carriers to facilitate inter-organizational B2G

relationships (cf. Scott (2001, 2008)). It takes into account the density of organizational engagement in business and governmental activities. Accordingly, Scott points to the role of carriers that help to transmit regulations to trading organizations preserving collaboration relevant constructs (cf. Scott (2001), p. 48). Still, AFII is made available in a descriptive, unformatted manner and is therefore vague to be implemented on larger scale. Sources about its usability to investigate standards' role in B2G further is limited. The institutional aspect of B2G collaboration formation is missing. The institutional role of standards in B2G requires further clarity of the role of standards in IS research. The role of standards in IS research was shaped by research contributions that focused on industry-specific collaboration scenarios. Research in cross-sectoral standards and the question if they generate an impact on B2G collaboration is little.

Thus, the purpose of this dissertation is to contribute to the closure of the research gaps. A choreographed approach of B2G collaboration formation is developed in this dissertation. It is investigating the roles and responsibilities of governmental actors. IS research on B2G and electronic government (e-Gov) is still tempting to focus on the regulatory role of governmental actors, B2G research topics ground on business-steered activities. The research topics are B2B flavored and embrace for example electronic procurement and document processing via the internet. In general, government has a mandate in public administration and management on national, community, and local levels. Concerning sustainable national corporate growth, a government stimulates for example both national and corporate interests by establishing social safety mechanisms and by governing these activities through economic, security, diplomatic, and political measures (cf. Bell (2002), p. 27). Successfully deployed measures are then expected to diminish the risk of competitive disadvantages, lost economic opportunities, and political misalignments (ibid.). Studies about the involvement of governments specify the tasks of governments further by (1) ensuring the smooth and continuous operation of the region's productive factors and by (2) collecting tax revenues (cf. Beaudreau (2002), p. 102). Studies argue that governmental presence in B2G collaboration evolved due to technological changes and fostered data transfer from a governing role on energy, labor, and capital, to an architectural role in market formation, and an active role in collaboration (ibid., p. 179-180).

Customs' emerging roles embrace now customs officials, supervisors, inspectors and guards with respect to goods control, border surveillance and society protection, tax auditors, IT personnel, VAT, customs duty, and excise collectors, risk and security

governors (cf. The World Bank Group (2004), p. 77; The World Bank Group (2005), p. 6-7). The variety of skills reveal a transformation of public sector specific skills towards a set of public management, customs specific, and IT skills. Research in this field contains multiple facets and is limited if a dedicated focus on either public management or IS research is given. The research focus on IS-enabled customs management widens by the inclusion of other research disciplines than IS research. Hence, research disciplines take advantage to link IS with other research fields and with the field of practice (cf. Grönlund, Å. (2005), p. 2). Once actor roles and their scope of activity are identified in the institutional context, the analysis of organizational and institutional constructs conclude in design principles of standard-enabled, thus electronic B2G network formation. The study among research topics in scientific contributions of e-Gov denotes the field of standardization and semantic standards as one of the "more established fields" (Grönlund, Å. (2005), p. 4). However, theory testing in e-Gov is limited and requires the exploration of different disciplines (cf. Grönlund, Å. (2005), p. 22). Disciplines that became relevant over the last decades are social sciences with focus on government studies, institutional theory with focus on network construction based on pre-formatted linkages, and IS research with focus on inter-organizational workflow and process management and standardization.

Hence, the research objectives that are proposed for this work are as follows:

(1) Understanding the role of IS standards in B2G collaborations and conditions under which they facilitate customs management and the collaboration between exporters and importers

(2) Investigating the influence of institutional forces on collaborations between business and customs organizations for export

(3) Identifying design principles for successfully institutionalized collaboration between businesses and customs organizations

(4) Designing and building a Procedure Model for B2G collaboration that facilitates customs management among business and governmental actors

This work uses a longitudinal case study that embraces three distinct B2G trade networks. Observations, learnings, and conclusions relate to the case study specific attributes and the researcher's role in the case study research. Resulting from the discussed research need and the identified research topics, the research in this work raises the following research question:

How and under which conditions do IS standards contribute to the effectiveness of B2G collaborations in customs management?

The research question subdivides into further questions that support the clarification of above-outlined collaboration characteristics and interdependencies:

Question 1: What are the characteristics of B2G collaborations in customs management?

Question 2: What are the effects IS standards have to-date on the collaboration between businesses and customs organizations?

Question 3: What are the prerequisites for a standard-enabled, customs-focused B2G Procedure Model and what does it look like?

Question 4: What factors contribute or impede the adoption of the B2G Procedure Model?

1.3 Dissertation Structure

The dissertation is divided into eight chapters. Each of the chapter is now introduced. The overall design of the dissertation and the structure is summarized in Figure 1.2.

Chapter 1 serves as an introduction into the dissertation. It outlines the reference disciplines that embed the research objectives of this work. Both practical and scientific gaps are presented to frame the scope of the work. Furthermore, the chapter presents the research question and sub-questions. Finally, it outlines the structure of the dissertation.

Chapter 2 is the theoretical and methodological basis for this work. It is dedicated to inter-disciplinary viewpoints in information systems (IS) standards research and discusses research themes and research methods that are applicable to this work. It focuses on the part of IS standards research that relates to IS research. Based on this assumption, the embeddedness of standards research in IS research still requires further direction and orientation. This chapter responds these needs. Furthermore, the aim of the chapter is to illustrate how standards research emerged under institutional conditions, to illustrate applicable research methods, and to result in the introduction of the research methods for this work. The chapter also introduces terms that are applied in the dissertation and are further referenced in the subsequent chapters.

Chapter 3 responds to the research objectives of this work and introduces a reference framework that gathers different aspects around B2G and offers the practical insights

into the research. The reference framework allows for assessing and classifying observations and provides the basis for collecting information and data needed. Hence, the reference framework is the basis to assess, develop, and construct research results. The chapter is concerned with the demonstration of a suitable context of the envisioned design result. It describes the reference framework and a case study as an application of the reference framework. The reference framework serves as research entry point to illustrate the motivation and the problems concerned with standard-enabled B2G collaborations in customs management. Herein, the chapter introduces the parameters applied to select a proper case, collect and code the data. After the case description, a diagnosis of B2G collaborations and relevant elements for the design of the artifact is conducted.

Chapter 4 provides an overview on forms of inter-organizational networks and filter criteria to assess business-to-government collaboration. Criteria that influence network formation, actor types, and binding elements are elaborated from the network overview. An assessment of network forms aims to reveal constructs and network formation specific criteria. It then concludes into necessary constructs of a procedure model and institutional steps necessary to form the B2G collaboration. The institutionalization of a trade-based B2G collaboration as presented later in this work is based on the findings of network formation activities. Emerging from commercial environments that cooperate and compete, collaborators are actors that share a common purpose (cf. Riemer & Klein (2006), p. 6). Relevant to this work, the purpose to form a network consisting of multiple, known and unknown actors is driven by organizations' interest to develop, share, coordinate, and exchange common activities (cf. Ebers (1999), p. 3-4). Actors shape scope and edges of their collaboration based on competitive and value driven needs (cf. Bjørn-Andersen, Henriksen, & Larsen (2004), p. 2). Individual actors that initiate, form, and join networks perform roles according to their level of interest in the network, expertise, and offering to the market (cf. Hess (2002), p. 7-9).

Chapter 5 provides an overview of standards. With respect to standards' relevance in information technology research, standards are credited with enabling integration between and among distinct technologies and applications. Contributions notably from David, Greenstein, Farrell, Saloner, Shapiro, and Varian allowed an integrated view of and contributed to economic, organizational, and network effects of standards (P.A. David (1995); Paul A. David & Greenstein (1990); Farrell & Saloner (1985, 1987); Shapiro & Varian (1999a)). Nurmilaakso, Kotinurmi, and Lemm are main contributors in the field of IS standards assessment (Kotinurmi, Nurmilaakso, & Laesvuori (2003); Lemm (2007); Nurmilaakso, Kotinurmi, & Laesvuori (2006)). To better assess the role

of standards in business-to-government collaborations, insights into standard types, standard development and deployment effects are required.

Chapters 6 and 7 concern the design and build of a procedure model to institutionalize B2G collaborations. The procedure model is called B2G Procedure Model (henceforth B2GPM). Key findings from the previous chapters and related work provide the frame to assess B2G relevant elements.

Chapter 6 covers the first round of design. Firstly, the chapter concerns the assessment of governmental and non-governmental actors. The second phase reveals institutional factors relevant for B2G. It builds upon institutional analysis proposed by Scott (Scott (2001, 2008)). The next phase assembles elements and puts regulatory environments and modes of coordination and access into context. It results in the design principles to design and build a procedure model for B2G. Leanings and findings of the first round of design are reflected in the chapter. Feedback provided by standards experts proves that little evidence on standards-related effects in the design of real-world B2G collaborations has been revealed in the first round of the design. This chapter is therefore dedicated to reveal reiteration potential.

Chapter 7 covers the second round of design by refining the elements of B2G collaboration and the design principles. It continues with the design of the procedure model. The multi-dimensional characteristics of B2G collaborations revealed a number of building blocks that form B2G collaboration. Among them, standards find an entry as institutional medium. The composition, description, and documentation of the procedure model are the core part of this chapter. Next, the evaluation of the procedure model takes place. The result of the evaluation concludes the chapter.

Chapter 8 is dedicated to the question of required organizational adoption to deploy the B2G Procedure Model that resulted from the design as provisioned in this dissertation. The model is seen as a procedural innovation by which B2G collaboration in customs management can be further improved. The capability of the B2G Procedure Model to affect inter-organizational collaboration depends on the adoption potential of the Model from an organization’s point of view. This leads to the question about the influencing factors of organizational adoption. These are subject to that chapter. Furthermore, the research results on organizational adoption are assessed beyond the cases within the reference framework.

Chapter 9 is the final chapter. The objective is to clarify findings of this work and relate the research question to its objectives. The chapter is structured as follows. It

summarizes the key results of the work. It answers the research question and sub-questions. Furthermore, it focuses on theoretical and practical contributions from this work and addresses limitations of this work.

Figure 1.2 illustrates the choreography in this dissertation. It outlines each of the above-introduced chapters and where relevant the corresponding section within selected chapters. The elaboration of related work in Chapters 4 and 5 follows the reference framework that is introduced in Chapter 3. The first phase of design and build in Chapter 6 is based on the findings and learnings from related work and the reference frameworks. Where supportive, Chapter 6 points to related work. The second round of design and build in Chapter 7 builds on the findings of Chapter 6 and grows from there iteratively. The evaluation of the design and build phases takes place for readability reasons within Chapters 6 and 7. Evaluation cycles take place in Chapter 7. Chapter 7 concludes the evaluation. Chapter 8 concludes the dissertation.

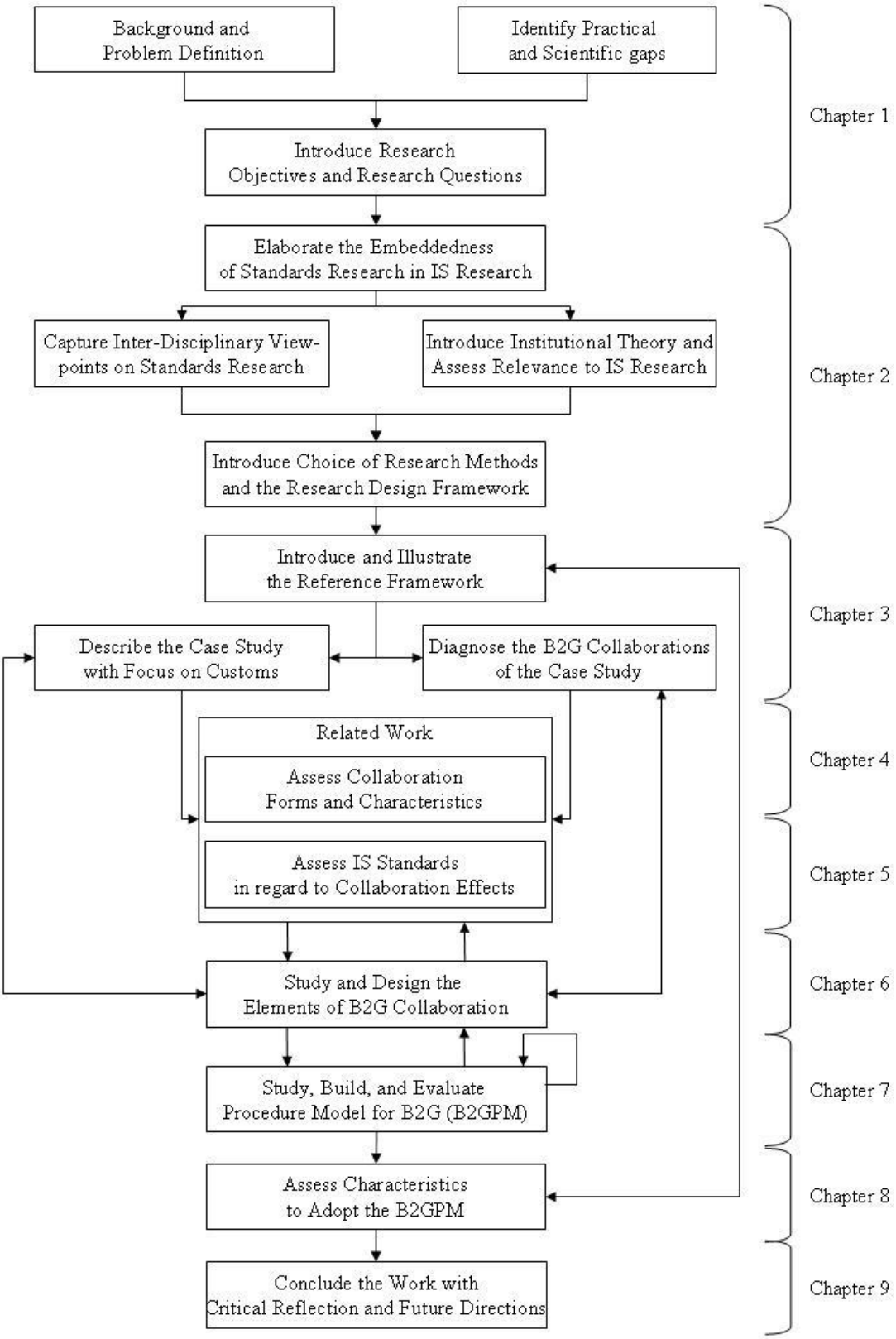


Figure 1.2: Dissertation structure

2 Embeddedness of IS Standards Research in IS Research

2.1 Introduction

This chapter forms the theoretical and methodological basis for this work. It is dedicated to inter-disciplinary viewpoints in standards research and discusses research themes and research methods that are applicable to this work. The embeddedness of standards research in IS research still requires further direction and orientation. Standards and standardization can be studied at different levels of analysis and from different theoretical viewpoints. Hence, critical voices might encounter a shortcoming of embedding standards research in general and the aspect of institutionalization in particular into IS research. Additional others might argue about the necessity of focusing in standards research on one discipline but not on other disciplines. Other voices might welcome the idea of inter-disciplinary alignment and the focus on regulatory-caused standards requirements (cf. King et al. (1994), p. 156-158). In this chapter, the aim is to illustrate how standards research emerged under institutional conditions, to illustrate applicable research methods, and to result in the introduction of the research methods for this work.

The remainder of the chapter is as follows. Firstly, the assessment in the next section points to the need of rotating viewpoints that are obviously caused by distinct, in particular governmental and business organizations that are involved in inter-organizational trade networks. The section concludes with the introduction of inter-disciplinary research in IS and therefore inter-disciplinary research in standardization. Secondly, the subsequent section introduces institutional theory and terminology that are relevant for this work. Based on the inter-disciplinary setting of standards research and the governmental, respective institutional environment in this work, the third section reflects on research methods proposed for inter-disciplinary IS research. Dedicated focus will be given to the role and relevance of procedure models. That section concludes with the introduction of the research method for this work. A summary in the fourth section points to key aspects and terms of this chapter.

2.2 Inter-Disciplinary Viewpoints in Standards Research

Research on the role of IS standards in network formation evolved from distinct research disciplines. Early viewpoints were taken from standard antecedents such as adapters and compatible products (cf. Katz & Shapiro (1994); Shapiro & Varian

(1999)). In fact, research areas ranged from economic, technical, to collaborative aspects of standards (cf. Farrell & Saloner (1986, 1987); Katz & Shapiro (1994); Tassey (2000); Turowski (2000); West (2004)). So did disciplines. The following section gives an overview of disciplinary schools that were contributing to the developing research field of standards. Furthermore, it adds to the discourse of the role of standards in IS research and the role of institutional IS research in standardization.

2.2.1 Emerging Role of Standards in IS Research

Early examples of standards are reported back to the days when formal agreements were necessary to regulate for example language in form of grammar and vocabulary, legislation in form of penalties, and commercially driven exchange of goods between human beings. A condensed summary of standardization effort was provided by Vu ((2007), p. 36-39) and is now briefly introduced. The process of standardization was apparent in ancient times when cultures developed standards for measurements and weights as for example in 3200 to 2800 BC in Mesopotamia. Further processes of agreeing upon a standard can be found in Ancient Egypt, Ancient China, and Ancient Greece. A well known example concerns the design and construction of the pyramids through standardized measures in Ancient Egypt. Another one relates again to technical standards such as for weights and measures in Ancient China in about 5000 years ago due to the efforts of the first emperor of China, Qin Shi Hoangdi. Technical standards were also introduced by Ancient Greece and concerned for example a standardized procedure for the production and testing of wines. Standardization efforts in Europe are mainly linked to standards set by the military as for example to reduce the variety of calibres. The benefit of standardization was also apparent for civil purposes as in the case of the design of ships. This was carried out by the Seven Provinces which constituted the Netherlands. In the period of the industrial revolution, standards matured in civil and military fields. One apparent factor of reported standardization efforts in that period was the ability of organizations to set or publish standards. Herein, one example is related to the War of Currents[2] between Edison and Westinghouse in the utilities industry in the late nineteenth century and the introduction of standardized railroad gauges (cf. Shapiro & Varian (1999a)).

[2] http://en.wikipedia.org/wiki/War_of_Currents

In case of the War of Currents, Westinghouse invented and introduced the alternating current system in combination with the polyphase. The combination outperformed the traditional approach of direct current systems that was established in the market by Edison. The alternating current system convinced with a better performance and a higher flexibility to attach new products. The direct current system compared to the alternating current system was an inferior product standard. In addition, the installed base of direct current systems in this case was not entrenched enough to resist the upgrade to the superior standard. Railroad gauges are another example of standardization through the harmonization of variances of products (cf. Shapiro & Varian (1999a)). The standardization was sensed necessary to ease the market entry of grain in additional regions of the United States and Canada. It eased transportation of products regardless the proprietary standards that logistics companies provided in the beginning. The combination of products, railroad gauge and wagons is used as an example that one product is strong enough to steer demand in the market and entail other products or combinations. Herein, differentiation on a 'product level' is being observed in the software business, too. Two approaches illustrate this further. Product combinations in terms of software combinations can be distinguished by vertical and horizontal compatibility. One research stream distinguishes vertical compatibility based on the compatibility between consecutive versions of technology (cf. Katz & Shapiro (1994)). Compared to that, horizontal compatibility relates to compatibility between competing systems (ibid.). Vertical compatibility in another context refers to the versioning of standards similar to the versioning of software applications. One example is papiNet. PapiNet, the issuing organization for a standard in the forest and paper industry, offers backward compatibility over a period of six months to ensure vertical compatibility to the previous version (papiNet, IDEAlliance, & AF&PA (2004)). Horizontal compatibility on the other hand focuses on standards that connect applications or services from different sources (Mendoza & Ravichandran (2007)). With that respect, horizontal standards are developed to be applicable to multiple industries (Mendoza & Ravichandran (2007)) whereas a vertical standard is focusing on a single industry (Nelson & Shaw (2005)). The above-outlined examples show the multiple purposes of standards: facilitating the communication of product-specific information, giving the opportunity to technological differentiation through interchangeable and adaptable parts, and affecting herein production, sales, and demand (cf. National Research Council (1995), p. 11-17).

An example of standardization efforts in customs goes back to the ninth century (cf. Adam (1996), p. 28-30): efforts concerned the standardization of weights, tariffs, transportation mean, and the document format that entitled customs officers and

personnel to collect duties. The Raffelstetter customs regulation or as referred to as the toll-list from Raffelstett describes in written toll exemptions, grants of markets, and mint rights (cf. Nelson (2003), p. 32). It regulated the authorization of toll collection in form of trade and market rights as well as the standardized minting of coins (ibid.). Following complaints of traders that feared unnecessary toll payments and unjustified tariffs, the input from more than forty traders and trader communities concerning what needs to be regulated how resulted in the toll-list from Raffelstett (cf. Adam (1996), p. 31-32). Documented as a formal certificate it accounts as the first entry of harmonized customs tariffs and trade standards documenting a nomenclature of transportation means, fifty-four customs codes, and the toll collection procedure for each of the means, codes, and goods (ibid., p. 41-68). Documented in hand-written registries, trade procedures and herein trade patterns were made replicable for customs efforts in the subsequent epochs. The usefulness of documented procedures was argued by the ease of trade, enhanced forecasting of customs duty calculation that serves the traders, and governed continuity of what could be expected in trade procedures (ibid., p. 29). It still matters in the analysis of standards to either become barriers to foreign trade or facilitators of standard-triggered investments to compete in foreign markets (cf. Herrmann-Pillath (2003), p. 23). Hence, firstly grounded in the need to facilitate logistics, standards according to Herrmann-Pillath become gatekeepers to foreign markets independently from their use in a customs activity or not (ibid., p. 25). In case market players sanction the entry by the enforcement of a standard, customs facilitation will not benefit from the standard's use as such. Sanctioning markets is hereby directly linked with the standards that are applied to the traded goods. Once that is resolved, IS standards contribute to information retrieval and management to accommodate electronic foreign trade process management. Further standards that apply to customs are as follows (cf. WCO (2004), p. 11-14):

- Procedural standards such as control procedures and certification procedures
- Job profiling standards such as levels of authority and inspection rights related to specific job profiles and corresponding skills.
- Compliance standards for security assessments, for example covered in the WCO Handbook for Customs Officers (WCO (2000)).
- Equipment standards that refer to cargo container equipment and other types of equipment that are used in loading, transporting, and securing.
- Risk assessment and risk mitigation standards.

- IT architecture standards that meet intra- and inter-organizational security agreements for example by implementing digital signatures.

- IS standards relating to intra- and inter-organizational information exchange and reporting that cover pre-defined data elements and groups for export declaration, cargo declaration, and import declaration.

Further customs related standards are issued to ensure that trade participants meet international and local security and collaboration measures in a consistent manner. The US security measures and herein the US Customs-Trade Partnership Against Terrorism (C-TPAT) certificate are one local example (cf. U.S. Department of Homeland Security (2001)). International agreements on security measures are for example described in the Agreement on Technical Barriers to Trade (cf. WTO (1986-1994)). These sources conclude in accreditation procedures to identify and validate business partners and certification programs that lead to preferred partnerships for trade participants. Besides WTO and WCO, there are further organizations that are active in the field of trade and customs. Most notable organizations are the World Bank, the International Transport Forum, the United Nations bodies including United Nations Economic Commission for Europe (UNECE), United Nations Centre for Trade Facilitation and Electronic Commerce (UN/CEFACT), United Nations Conference on Trade and Development (UNCTAD), and furthermore organizations such as the International Road Transport Union (IRU) and the International Maritime Organization (IMO).

One of the first prominent examples of non-product IS standards is EDIFACT. Since the 1970s, EDIFACT has been implemented by and adopted in a variety of industries and organizational types. Research covered adoption, diffusion, and intra-organizational impact of EDI and bilateral implementation scenarios of EDI (K. V. Andersen, Juul, N. C., Henriksen, H. Z., Bjørn-Andersen, N., & Bunker, D. (2000); Bjørn-Andersen, N. & Krcmar (1995), Henriksen (2002); Teo, Tan, & Wei (1997); Zhu et al. (2006)). Along the trajectory of EDI, inter-organizational studies emerged. Inter-organizational characteristics of the EDIFACT standard were tested on international, national, regional, and industry wide levels (Buxmann, Wüstner, & Kunze (2005); Hamaya (2004); Henriksen (2002); Iacovou, Benbasat, & Dexter (1995); Janner, Schmidt, Schroth, & Stuhec (2006); Tullverket (2006)). Negative impact caused by EDI resulted from expensive adapter development, maintenance costs to ascertain application connectivity and personnel costs for training, data checks and manually carried-out activities (Damsgaard & Lyytinen (2001); Henriksen (2002); Jain & Zhao (2003); Reekers (1994)). Furthermore, the lack of standardization was encountered as a major drawback of EDI diminishing network effects, namely hampering scalable and flexible

collaboration (Damsgaard & Lyytinen (1994); Hansen & Hill (1989); Henriksen (2002); Pfeiffer (1992)). Nevertheless, EDI served as an entry point to network relevant IS research.

Fricke et al. studied the growing role of standards in inter-organizational business activities (cf. Fricke, Götze, Pols, & Renner (2006), p. 28-30). Herein, the phases of initiation and deployment of standard development are directly connected to the ability of inter-organizational standardization management. Among studied benefits of standards use, they point out process optimization and efficiency, reduction of error-prone data entry and handling, as well as improved inter-organizational transaction and process management among collaborating actors. Though one of the research findings of Fricke et al. is a positive network effect of standards, only a few of to-date made available standards are in use according to the authors. The main reason for the limited use is the limited use of the collaboration partners that participate in a network. Thus, the network effect among actors has not been started yet or was not executed successfully. One of the obstacles the researchers disclose is the missing knowledge transfer from the party that develops and issues standards to the organizations that apply and internalize standards. Moreover, the study outlines the lack of available information sources and applicable material that needs to be provided by the SDO. Hereby, organizations are reluctant to apply a standard.

Although Fricke et al. do not explicitly refer to the challenging role of SDOs in inter-organizational collaboration. They confirm the findings of Nelson and Shaw (2005). Nelson and Shaw focus on the diffusion potential and limitations of standards related to the diffusion potential and limitations that SDOs cause (cf. Nelson & Shaw (2005), p. 7-8). The unit of analysis of the researchers is the individual organizational that is embedded in an industry, sector-driven network. The theoretical basis the authors apply is the diffusion of innovation. Though the study is limited to industry standards, it investigates the potential that SDOs have to derive standards characteristics from inter-organizational business processes and make use of them in cross-industry standards development. Industrial SDOs prefer to incorporate standards that relate to their sectoral requirements and adhere to the terminology and IS standards that are specific to the industry. Furthermore, the researchers outline a standard development process that addresses inter-organizational needs. In standardization, SDOs drive the initiation of a standard and the consensus finding process. The participants in the study reflected on SDOs to be accountable for testing, documenting, and promoting common use of the standard within a given industry.

In alignment with Nelson and Shaw, Mendoza et al. confirm the institutional element of standardization and the institutional role of SDOs. Moreover, they extend the question on the relevance of SDOs in a given, industry-focused network by adding environmental, adoption relevant factors to the research field (cf. Mendoza, Ravichandran, & Jahng (2005), p. 496-498). Among them, there are environmental factors that are driven by SDOs: the convergence of standard development activities within and among SDOs, the collaboration degree of SDOs and the degree of inclusion of business partners in SDO activities. The study concludes that more participants and a higher degree of participation in SDOs reduce the risk of knowledge barriers and increase the knowlegde transfer among collaborating actors. Moreover, business partners will experience a benefit by other business partners that legitimate standards through standards adoption as well as compatible products and services in their network.

Unlike previously introduced studies, Hofreiter and Huemer use an organizational population as unit of analysis. An organizational population comprises of alike organizations that conduct similar tasks and have a similar set of operational activities (cf. Scott (2001), p. 84). Hofreiter and Huemer concentrate on the population of small and medium-sized enterprises (cf. Hofreiter & Huemer (2003), p. 1-3). They introduce in their study the work of the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) as a-typical SDO. UN/CEFACT is not an industry-led SDO but an organization that models the transformation of inter-organizational business process knowledge into formally notated transactions and therefore software applications regardless the industrial focus of the interaction (cf. UN/CEFACT (2009)). By this, it allows the capture of business knowledge from an inter-organizational perspective and the assessment of relevant data element in inter-organizational transaction processing. Furthermore, UN/CEFACT provides in the modeling approach the level of detail that is required for the analysis of business knowledge and design of business transactions. Compared to the previous findings on the lack of SDO driven enforcement, UN/CEFACT is making material available and accessible on a free-of-charge basis. Hofreiter and Huemer apply the material to the entire organizational population. It has to be noted that the researchers propose pre-formatted business knowledge that is captured on services offered by software providers. They follow the recommendation of Mendoza et al. to increase the number of participants in SDOs and therefore to achieve legitimacy throughout an increased service and product offering. Once adopted, standards then become an essential building block in vertical, supply- and distribution chains. Studies in this context are being provided by (cf. Nelson & Shaw (2005), p. 5; Kallioranta & Vlosky (2002), p. 1-2; Sissonen (2002), p. 41). The

diversity in research themes concerning standards reflects the emerging character of standards. The themes can be assorted twofold: firstly by assessing the lifecycle of a standard and secondly by measures that concern the impact of a standard. The stages of the lifecycle of a standard are hereby structured by initiation, development, deployment, diffusion, and discontinuation (Table 2.1). With respect to the measurement of impact, related work refers to the effects of a standard (Table 2.2).

Table 2.1: Relevant research themes to assess the lifecycle of standards

Lifecycle stage	Most commonly noted themes
Initiation	Trigger for standard development Intra- and inter-organizational perceived effects of a standard that urge its need
Development	Actors that are or become involved in standard development Organizational aspects of standard development Phases of standard development
Deployment	Trigger for standard diffusion
Diffusion	Process and phases of diffusion Organizational adoption Network adoption and collective actions Diffusion measures such as economic and network effects
Discontinuation	Assimilation of industry-related standards Orphaning risk of a standard

Table 2.2: Relevant research themes with regard to the impact of a deployed standard

Economic effects of a standard in organizations and markets
Network effects of a standard on market formation
Qualitative benefits of a standard
Driving innovation through the standardization of a product, service, or a standard-enabled market
Organizational and operational (intra-organizational) effects of a standard on businesses and governments
Domain specific (sectoral) effects of a standard

In interest of the research focus in this work, impact is being measured once a standard becomes deployed. Further perspectives on the impact measurement of a standard are possible, however not scope of this work. Examples concern the impact of a standard on application engineering, procedural changes, and the influence of standards on human-human interaction.

Apparently, referring back to the lifecycle assessment of standards, themes are more diverse in the phases ‘deployment’ and ‘diffusion’ than in standard initiation and

development. The phases ‘initiation’ and ‘discontinuation’ are least evolved than the others. Besides the initiation of standard development through SDOs, reasons for the initiation of standard development result from positive effects of standards on operational activities (cf. Liebowitz & Margolis (1995), p. 207). One explanation for the focus on standard deployment and diffusion in research is that the interest in the impact of a standard and the measures to justify the deployment of a standard gain higher attention than the initiation or development of the standard. In case of IS standards such as EDI, the existence and variety of EDI implementations in industries, organizational networks, and the role of IT in standard diffusion provides better access and greater research material to researchers and supports them in scenario building and comparative analyses. Less research has been conducted to investigate the stage of discontinuation. One reason for the neglected stage of standard discontinuation is the late timing of making study subjects in EDI accessible and visible. To better illustrate the timing aspect, Table 2.3 aligns per lifecycle stage published material and the year of publications to the most commonly noted themes. Concerning publications that contribute to the impact measures of standards, Table 2.4 lists related work. With respect to ‘discontinuation’, research contributions approximate discontinuation from two sites. On the one hand, research contributions discuss the potential of standards to address the convergence vertical standards (cf. Nurmilaakso, Kotinurmi, & Laesvuori (2006), p. 598). On the other hand, researchers discuss discontinuation from a standard’s risk to become orphaned (cf. Mendoza, Ravichandran, & Jahng (2005), p. 496). Both fields of standards research are quite new and require further elaboration.

As outlined in Table 2.3, publications concerning deployment and diffusion started in the late 80’s (cf. Davis (1986, 1989)). Subsequently, further stages of standardization started not until recently. Research findings are therefore limited, too. A second observation from Table 2.1 relates to the phases of standardization. Based on the number of publications, studies focus on deployment and diffusion. There is still a broad range of diffusion relevant research questions to be raised. Concerning the role of collaborating actors, recent questions are if a standard reaches acceptance because of being collectively diffused by a number of actors and how does acceptance evolve if diffusion is being enforced by dominant actors in a network. In the field of economics, transaction cost theory applies direct and indirect cost types that are mostly applied to standards deployment. Transaction costs based studies that relate to initiation and discontinuation of standards are missing. The efforts in migrating from one to another standard were subject in the early stages of EDI implementation concerning the migration from non-standard based solutions to EDI. The lifecycle assessment concludes that more cases are required to study less studied lifecycle stages. In addition,

research on comparable efforts in standards' migration should be added to the research agenda. Relevant related work that focuses on impact measures is encountered by a variety of measures (Table 2.4).

Table 2.3: Publications in relevant research themes to assess the lifecycle of standards

Lifecycle stage	Most commonly noted themes	Publications
Initiation	Institutional role of standards Trigger for standard development Intra- and inter-organizational perceived effects of a standard that urge its need	Scott (1987, 1990, 2001, 2005, 2008) Damsgaard and Lyytinen (2001) Brunsson and Jacobsson (2002) Markus, Majchrzak, and Gasser (2002) van der Aalst and Kumar (2003)
Development	Actors that are or become involved in standard development Organizational aspects of standard development Phases of standard development Economics of standard development	Löwer (2005) Reimers and Li (2007, 2008)
Deployment	Trigger for standard diffusion Actors' influence on open innovation in networks	Davis (1986, 1989) Bjørn-Andersen and Krcmar (1995) Iacovou et al. (1995) Teo et al. (1997) Andersen et al. (1998) Andersen et al. (2000) Henriksen (2002) Chesbrough (2003)
Diffusion	Process and phases of diffusion Organizational adoption Network adoption and collective actions	Davis (1986, 1989) Shapiro & Varian (1999a, 1999b) Thong (1999) Damsgaard and Lyytinen (2001) Wigand et al. (2005) Mendoza, et al. (2005) Markus et al. (2006)
Discontinuation	Assimilation of industry-related standards Orphaning risk of a standard	Kotinurmi et al. (2003) Nurmilaakso (2006) Mendoza et al. (2007)

Table 2.4: Publications in relevant research themes with regard to the impact of a deployed standard

Most commonly noted impact measures	Selected publications
Economic effects of a standard in organizations and markets Network effects of a standard on market formation Qualitative benefits of a standard Driving innovation Organizational and operational (intra-organizational) effects of a standard on businesses and governments Domain specific (sectoral) effects of a standard	David & Greenstein (1990) Damsgaard and Truex (2000) Henriksen (2002) Buxmann (2004) Buxmann et al. (2005) Zhu et al. (2006)

Apart from the relevance of themes that affect the choice of theories, Salazar argues that the units of analysis influence the selection of theories (cf. Salazar (2005), p. 3-4). Examples of units of analysis are single organizations and organizational populations. In case the analysis is limited to an individual organization, IS research encounters unnecessary restrictions. In other words, multi-level analysis is required to assess the evolvement of IS research and to explore future trends. Moreover, by allowing multiple, inter-disciplinary viewpoints, IS researchers are able to take into account the emerging field of IT and the managerial, socio-economical, and institutional dimensions of IS research.

2.2.2 Inter-disciplinary Diversity in Standards Research

The following contributions give an overview of the disciplines in IS research that point to standards research. Hereby, the perspectives on applied disciplines are twofold. Following the approach from above, the assessment of disciplines investigates per lifecycle stage and impact measurement which disciplines are mostly being applied in related work.

Concerning the perspective on lifecycle stages, one of the most prominent example is the evolvement of diffusion potential of IS innovations (cf. Rogers (1995); Thong (1999)). In this context, notable research is being conducted from the viewpoint on the diffusion of standards (cf. Damsgaard & Lyytinen (2001), p. 196-197; King et al. (1994), p. 157-158; Monse, Kubicek, & Reimers (1993), p. 49-51; Andersen (1998), p. 31-32). Furthermore, related work contributes to the role of design-based principles to develop standards, inter-organizational processes, and information systems (cf. Markus, Majchrzak, and Gasser (2002), p. 93-95; van der Aalst & Kumar (2003), p. 23-25). Research investigates the economics of vertical and technical standards (cf. David & Greenstein (1990)). The formation of networks and construction principles is subject of

network theory (cf. Brass (1995); Riemer & Klein (2006)). Legally imposed procedures that transform into institutional structures are subject of the theory of new institutionalism (cf. Selznick (1948)). New institutionalism in this stage is recognized for the analysis, design, and establishment of social and legal structures in an IT driven environment (cf. Vassey, Ramesh, & Grass (2002), p. 131). The process of transformation considers standard-based procedures. It is expected that an organization's behavior in a network change due to externally triggered events such as regulations (cf. Oliver (1991), p. 148-149). In this context, Björck studies the influence of standardized procedures on networks (cf. Björck (2004), p. 2-4). The published material that is referenced above applies distinct disciplines too. The disciplines serve as the theoretical basis for the research themes. Table 2.5 expands Table 2.3 (see **Table 2.3**) and Table 2.6 expands accordingly Table 2.4 (see **Table 2.4**) by adding the theories to the referenced material.

Table 2.5: Alignment of theories to the lifecycle of standards

Lifecycle stage	Most commonly noted themes	Applied theories
Initiation	Institutional role of standards Trigger for standard development Intra- and inter-organizational perceived effects of a standard that urge its need	New Institutionalism
Development	Actors that are or become involved in standard development Organizational aspects of standard development Phases of standard development	Diffusion of standards in Information Technology
Deployment	Trigger for standard diffusion Actors' influence on open innovation in networks	Diffusion of standards in Information Technology Organizational Theory
Diffusion	Process and phases of diffusion Organizational adoption Network adoption and collective actions	Diffusion of standards in Information Technology Actor-Network-Theory
Discontinuation	Assimilation of industry-related standards Orphaning risk of a standard	Diffusion of standards in Information Technology

Table 2.6: Alignment of theories to impact measurement of standards

Most commonly noted impact measures	Applied theories to assess impact measures
Economic effects of a standard in organizations and markets	Economics of standards
Network effects of a standard on market formation Qualitative benefits of a standard	Organizational Theory
Driving innovation through the standardization of a product, service, or a standard-enabled market	Diffusion of innovation
Organizational and operational (intra-organizational) effects of a standard in business and governments	Actor-Network-Theory
Domain specific (sectoral) effects of a standard	

The above-introduced alignment of research disciplines and themes correspond to the findings of Vassey et al. According to Vassey et al., the variety of theories and themes that are being used in different stages of standardization reflects the evolvement and maturing field of IS research (cf. Vessey, Ramesh, & Grass (2002), p. 12-14). They detailed, based on the four levels of analysis of Bariff and Ginzberg (cf. Bariff & Ginzberg (1982), p. 22-23), the organizational element of IS design and development. This resulted in 10 levels of analysis as for example inter-organizational and societal levels of analysis. With that respect, the resulting levels of analysis correlate to the levels of analysis of a standards lifecycle. Concluding the assessment, multiple disciplines are applicable. The diversity in the definition of themes and categorization leaves it up to the individual researcher to adhere his research to better target the future IS research interests.

With respect to the theoretical basis, information systems as well as the schools of management and economics are frequently applied disciplines. Furthermore, computer science, social and behavioral science, and management science are commonly applied. The study does not detail the applicability of new institutionalism in IS research. Therefore, a screening of IS contributions in the period of 1996 to 2008 was conducted in addition to the study of Vessey et al. that evaluated journal articles in the period of 1995 to 1999. The result is outlined in Table 2.7.

Table 2.7: Institutional IS research publications

Emerging number of IS relevant publications that apply institutional theory [year, number of publications]												
1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	2	1	3	1	3	7	10	11	11	8	11	9

A detailed list of the publications per annum is made available in the Annex in Table A.9.1 (see **Table A.9.1**). It reveals an increasing interest in the use of institutional theory as reference discipline for IS research.

2.3 Basics in Institutional Theory and its Scope in IS Research

Network theory, the schools of economics and management, and diffusion of innovation are disciplines that provide orientation to IS and therefore standards research themes. As pictured in the previous section, standards relevant themes attest that institutional theory plays a role in standards research. The institutional approach however requires an introduction into basics of institutional research to understand better the potential scope of institutional theory in standards research.

The remainder of this section is as follows. An introductory summary in institutional theory follows. Relationships among research disciplines are assessed from the viewpoint of institutional forces on standards research. This section chooses among the number of elements that materialize institutional theory and reveal how different researchers' made use of them. After an introduction into institutional elements and the impact on inter-organizational institutionalization, the section continues with an assessment of how IS research applies institutional elements and concepts. Then, the section concludes with an overview of how IS research combines institutional elements with strategic management and socio-organizational elements.

2.3.1 Institutions, Organizations, and Institutional Impulses

Institutions are defined as social constructs that guide individuals and organizations in their daily life in normative, regulative and cultural-cognitive ways (cf. Scott (2001), p. 48). Composed of cultural-cognitive, normative and regulative elements, institutions represent common beliefs and logics of action in the cultural-cognitive pillar, normative certifications and accreditation based norms, and the regulative pillar that builds on rules, laws, and sanctions. To become successfully deployed and activated, institutional elements need a "transmitter" (Scott (2001), p. 48). Transmitters appear to actors in various forms. Scott denotes "symbolic systems, rational systems, routines, and artifacts" as transmitters (ibid., p. 77). Dependent on the content that is being transmitted, carriers could embrace "cultures, regimes, and organizations" (Jepperson (1991), p. 150). Institutions convey stability. The resilient character of institutions results from social structures and associated activities and resources that are transmitted

to a community and by which network participants perceive stability and meaning to life (cf. Scott (2001), p. 48). Life hereby could be regarded as personal living conditions or corporate life conditions of commercial or public organizations. In corporate life, resilience is being achieved through the employment of regulative, normative and cultural-cognitive elements. As a result, this work investigates the potential of standards to become transmitters of legislation.

The process of deploying institutions is being observed from within an organization and across organizations. Early institutional theorists started with the focus on intra-organizational elements. They argue with constructs of rational action and the ability of organizations to perform as adaptive organic systems once institutions are being made available and implemented (cf. Selznick (1984), p. 5-6). Another way to look at stability within and among organizations is the construct of ties that bind actors to an organization and organizations to an environment. Brass applied the concept of ties to evaluate

- indirect links defined as pairs of social interrelationships within a network against mediating ties that link actors,
- stability and frequency that are both based on the existence of and occurrence of links,
- multiplexity of ties between a pair of actors and the strength thus intensity of ties,
- direction of the workflow from one actor to another and symmetry thus the existence of bidirectional ties (cf. Brass (1995), p. 6).

Following Brass' concept of ties, interrelationships become institutionalized if they are repetitively used and cultivated within and between actors (cf. Brass (1995), p. 11; Scott (2001), p. 48-49). In this context, Barley stated: "it is difficult to see how any social structure can be produced or reproduced except through ongoing action and interaction" (Barley (1990), p. 64-65). Thus, organizations succeed in the institutionalization of ties if they are able to establish and automate procedural routines, scripts and instructions (cf. Barley (1990), p. 64-65). The study of Barley is frequently cited to illustrate the impulses that affect organizations and users. In this case, technology empowered users with decentralized, user-centric decision-making and transferred authority and power to individuals. Still, it needs to be examined if the introduction of technical means in other cases affects users similar or differently.

The traditional character of institutional studies as observed in the examples of Selznick and Barley are organization-centric and of intra-organizational nature. The changing and evolving character of institutional studies reveal a shift from intra-organizational, thus internal, to inter-organizational, thus external impulses. Several scenarios are possible to illustrate internal and external impulses. Technology triggers a think over of internal procedures and the effect technology has consequently on the personnel executing these procedures (cf. Barley (1990), p. 61-103). The often-cited case of Barley, illustrates that a management decision on entering new markets imposes the functional departments to revisit product placement, marketing and sales strategies, and to assess knowledge needed to respond to a strategic decision as exemplified in this scenario. External impulses result from activities, decisions, and factors that confront an organization with a given or prospective external fact or environmental change. Following the approach in systems engineering, the analysis of external influencers requires to specify source, type, and impact of environmental factors on an organization (cf. Daenzer (2002), p. 115-116). A feasible classification of environmental factors denotes ecological, legal, political, macro-economic, financial, personnel, demographic, and technical factors as essential (ibid.). Strategic decisions concerning market positioning of a hospital for example become then externally influenced by scientific and technological innovations, primary care needs, labor market constraints such as available skilled personnel and labor market demands in form of reduced working hours and salary increase (ibid.). The development of technological innovation is influenced by a range of factors such as regulatory, societal and personnel behavior (Jarzabkowski & Wilson (2006), p. 350). Besides organizations and individuals, further addressees of external impulses are countries and regions. Emerging countries are confronted with conventions, regulatory requirements, and market expectations issued by external governmental and non-governmental sources (cf. Stephenson (1997), p. 61-62). Sources embrace trade regulations and agreements as well as import procedures of targeted countries. In case of manufacturer-supplier-relationships, external impulses trigger supply chain optimization programs and procurement programs. With respect to entire networks, research areas cover not only the physical product and distribution chains, but also the virtual value chain (cf. Rayport & Sviokla (1995), p. 77-78; Bovet & Martha (2001), p. 23-25). To sum up, external impulses not only influence but also require organizational and individual actors to analyze environmental factors and internalize them.

In institutional research, distinct streams add to the study of internal and external impulses. Early beginnings of institutional research in that context emerged from the growing research interest in formation and change of organizations. Among those, the

following contributions are seen as mostly relevant to the discourse on collaborative environments. Committing to the element of value, Selznick reflected on organizations that incorporate value into behavior and define processes to establish and maintain value driven commitments (cf. Selznick (1984), p. 17). Furthermore, he reflected on organizational objectives of which norm- and value-driven achievements are dependent on the rational action of actors on the one hand and the ability of an organization to deal with behavioral influence of its employees and its environment on the other hand. Selznick's focus was intra-organizational and norm driven. Merton applied as well value in form of "socialized rewards" (Merton (1938), p. 674). They become the trigger for institutional commitment among actors. Leaving Selznick's focus on value and norms, Merton elaborated in his approach inter-organizational mechanisms such as procedures and inter-actor activities (cf. Merton (1938), p. 677): institutions are binding elements that tie up organization-organization and actor-actor relationships. He refers to external activities and connotes the need of defining inputs and outputs for further inclusion of inter-organizational activities. In fact, Merton emphasized the institutional importance of inter-organizational processes.

According to Scott, organizations face limitations in their ability to respond to inter-organizational matters (cf. Scott (2001), p. 24). His arguments are as follows. Inter-organizational activities have the potential to influence intra-organizational habits. Still, organizations tend to establish safeguarding measures by which they want to keep their intra-organizational procedural and organizational constructs and protect them against external influence. Once safeguarding measures are in place, organizations will then accept external institutionalization if they encounter rationale to grow externally and do not need to compromise their habits. Building on Parsons' argument of institutional authority in an inter-organizational environment (cf. Parsons (1953)), Stinchcombe added the elements of power and authority to the discourse of organizational embeddedness and demographies (cf. Stinchcombe (1968)). The attribute of power is used to maintain and preserve habits. Authority concerns power-holders. Stinchcombe argues that ongoing success of institutionalization exists if power-holders exist. This argument however requires further examination in inter-organizational environments. It is suggested to examine not only power-holders but also power-providers and the interplay of power-providers and –holders in an inter-organizational environment. Power-providers such as authorities and governmental institutions could legitimate power-holders in other organizations.

Having addressed institutional elements in inter-organizational collaboration, there is still a need for clarifying the term 'institutionalization'. To Selznick, institutionalization

describes a process where organizations and individual actors agree upon the “creation of a formal structure” (Selznick (1996), p. 271). Along the trajectory of institutional research, Scott strengthens Selznick’s position in including behavioral, self-educating characteristics to the process of institutionalization (cf. Scott (2001), p. 23-24). In new institutionalism, the process of institutionalization appreciates the environmental and cultural setting of an organization and encounters the need of legitimacy to foster the institutionalization of procedures and regulations in a network or similar setting (cf. Selznick (1996), p. 273). Organizations are regarded as being capable of establishing institutions and accommodating themselves to institutional behavior. They sense institutional conformity as a competitive advantage and institutional behavior as must-have, need-to-do, and committed-to behavior. In case institutionalization fails, organizations risk locking themselves out from collaborative environments while other actors behave conformably to institutional behavior and stay in business. Moreover, researchers point to the process of institutionalization because of its ability to observe inter-organizational collaboration formation from a governed point view (cf. Scott (2001), p. 89). Once established to connect actors, institutions respond to regulatory conformity of organizations and facilitate the analysis of collaborations from distinct, organizational perspectives.

Another characteristic of institutionalization is timing. Timing is relevant because of the fact that the execution and deployment of institutions do not take place with immediate effect once the institutions are being created (cf. Scott (2001), p. 115-116). In the case of regulatory changes, the process of institutionalization is defined by the process and duration of law enforcement. This covers legislative drafting, generating and assessing regulations, design and implementation of regulations, as well as the consensus seeking and decision-making activities in jurisdiction (cf. van Engers et al. (1998), p. 328). Decision-makers and influencers in trade policies account timing for the status by which trade policies become effective in federal, state, and local premises, and therefore executable in the society (cf. Otto & Antón (2007), p. 2). In the area of financial control and security policies for electronic commerce, the point of time at which legislation engineers are aware of upcoming regulatory changes triggers the responsiveness of IS engineers that need to deploy changes as efficient and timely as possible in the IT applications (cf. Antón & Earp (2000), p. 3-4; Karagiannis, Mylopoulos, & Schwab (2007), p. 321). With best knowledge of this work, the process from bill drafting to passing is not explored yet from an institutional perspective. To successfully conduct the exploration, a phase-driven model that determines roles and responsibilities would require an IS driven assessment of institutional forces.

2.3.2 Institutional Elements in IS Research

Along the discourse of institutional theory, it needs to be asked about the applicability of institutional theory in IS research or, more specifically, IS driven standards research. The following paragraphs present four studies that were selected because they apply institutional elements in the context of IS research. These were published by Reimers and Li, Damsgaard and Lyytinen, Graham et al., Kaye and Little, and Björck (Björck (2004); Damsgaard & Lyytinen (2001); Graham, Pollock, Smart, & Williams (2006); Kaye & Little (1996); Reimers & Li (2008)). Each of the named studies are presented in a separate paragraph including an abstract that describes the research question, the context of the research, and the research approach. Institutional elements are highlighted and explored for each of the studies. The presentation of each of the studies concludes with key observations.

The study on electronic commerce (e-commerce) system development concentrates on the pharmaceutical sector in the province of Beijing (cf. Reimers & Li (2008)). The research is concerned with the question if technological change differs from institutional change and if not to what extent the interplay of technological and institutional changes steer, limit, or accelerate the use of information technology. Technological change relates to the development of an e-commerce system and its implementation along the distribution chain of pharmaceutical products. Institutional change refers to the change of economic structures of which the reform of the health insurance system is a focal reference in the study. A network of governmental authorities, manufacturers, suppliers, intermediaries, and hospitals characterizes the healthcare sector. Examples of governmental authorities are the Beijing Price Bureau and the Beijing Traditional Chinese Medicine Bureau. The focus of inter-organizational activities is on ordering and purchasing. The institutionalization of the bidding processes and interrelated governance measures is based on regulatory changes as previously outlined. Institutional elements that are applied in the study are distinct units of analysis, as of which are organizations, organizational population, and the organizational field of pharmaceutical industry in China. Intermediaries are brokers that obtained bidding rights through a certification process. The bidding process affects customers as well as intermediaries. The certification process itself is subject of a governed process by local authorities. The research approach is a single case study with dedicated focus on transaction cost theory. Besides the influence of inter-organizational structures on transaction costs, the analysis revealed the influencing character of intermediaries on product and delivery costs, and the ability to monitor governance measures. The business process analysis among actors and the interactions between actors was presented in an unformatted manner. The research concluded that the introduction of the

e-commerce system fostered the institutionalization and maintenance of regulatory changes.

The role of intermediating institutions is also subject of a cross-country study on the diffusion of EDI (cf. Damsgaard & Lyytinen (2001)). The study focuses on the organizational structure, inter-organizational role, and institutional impact of intermediaries. Intermediaries in this case are industry associations that are active in Denmark, Finland, and Hong Kong. Concerning the diffusion of EDI in industry driven networks, the study embraces three mini cases in industry-focused, organizational fields. It concerns the role of intermediaries in the grocery sector. Intermediaries are industrial associations, suppliers, wholesalers, customs, freight forwarders, insurance companies, and banks. With respect to inter-organizational linkages, the study assesses horizontal and vertical interrelationships in the three countries and applies organizational forms that are comparable to associations. Institutional measures follow the classification scheme of regulatory and influential measures. Regulations steer the handling, distribution, and identification of agricultural products. Influential measures are referred to as knowledge building and deployment, as well as the mobilization of applying standards. Furthermore, influential measures concern the ability of intermediaries to offer financial subsidy to their members in the network. The study itself observed the usage and necessity of IT standards such as barcode systems and EDI. The study focused on one institutional element, the association, and for which IT standards are being developed, promoted, and implemented in the network. The study did not elaborate further inter-organizational activities and processes. It concludes with a recommendation that cultural, normative, and regulative behavior is to be included in future IS studies.

A rather distinct notion of intermediaries in standardization and the institutional impact of standard development organizations (SDOs) are taken in the study of Graham et al. (cf. Graham, Pollock, Smart, & Williams (2006)). The unit of analysis is the SDO in the field of B2B collaboration. The institutionalization process is in the focus to assess the involved parties in standardization and the geographical spread of standards that relates to the ‘institutional reach’. The latter term is hereby introduced in this work and is defined as the geopolitical coverage of an institutionalized standard. Institutional reach is not assessed yet in related work. Further elements of the institutionalization process are described in an undescriptitive and unformatted manner. The study concludes with the introduction of convergence trends among SDOs and the need of an international assessment to deduce a generic approach for standard development and deployment. Moreover, the need for convergence among standards reflects the demand of cross-

regional consensus and conflict management in standard development. SDOs to-date are organized only to a certain extent on a cross-regional basis and experience limitations caused by cultural differences and the scope of standard deployment.

The notion of cross-cultural information systems found entry in the research on multiple dimensions of institutional elements (cf. Kaye & Little (1996)). Throughout the analysis of IT standards and their potential of being diffused to users and suppliers, the authors applied institutional theory to investigate the hampering and promoting effects of standards in a network. The units of analysis are based on four studies that were issued within 1983 and 1989. The studies focused on individual organizations. Among the research on transaction costs, the assessment was concerned with the impact of regulation and de-regulation in standards usage. Cultural differences in the four cases reveal the difficulty to assess the success of regulatory, institutional change in standards acceptance. On the other hand, the study reveals the influence of cultural legacy in different stages of standardization, namely development, redevelopment, and reverse engineering. Any of the named stages affect the observed organizations differently. Thus, a generic conclusion cannot be made.

A more comprehensive analysis of distinct institutional units of elements is subject to the research on IS/IT security in organizations (cf. Björck (2004)). The units of analysis follow the Analytical Framework II as being introduced by Scott (cf. Scott (2001), p. 83-85). The Analytical Framework II (AFII) distinguishes collaboration levels from world system, societies, and organizational fields to organizations and organizational units. In the societal cope of Sweden, Björck assesses the finance sector as organizational field in which as "a result of the activities of a diverse set of organizations and that refers to the totality of relevant actors"(Scott (2001), p. 84). Examples of organizational fields are corporate banks, organizations are specific banks, and the corporate finance departments are referred to as organizational subsystems or units. Unlike the other contributions in IS research, Björck conducts the institutional analysis along four carriers that connect above-outlined organizational constructs. The carriers are as follows: symbolic systems, relational systems, routines, and artifacts. Whereas rules and laws denote symbolic systems and governance systems relational systems, standards and standard based procedures do account for routines. The standard that is being further assessed is the international standard ISO/IEC 17799. The study reveals that intra-organizational behavior is being influenced by formal, institutional elements such as regulations and directives. It outlines the need for an institution-based pre-assessment of regulations and directives before reacting on them. It strengthens the argument of including institutional elements in IS research.

2.3.3 Role of Institutional Theory in Collaborative Environments

Concerning the influence of institutionalism on collaborative environments and organization-to-organization-relationships, the following section is dedicated to institutional elements such as organizations, organizational population, and inter-organizational interactions.

- The School of Economics supports institutionalists by rational, economic arguments that drive the existence of institutions (cf. Scott (2001), p. 28-33). The most assessed research mean is the one of transaction costs (cf. Williamson (1993), p. 167-168) and organizational transformation costs (cf. North (1990), p. 363-364). Research studies are mainly concerning how regulations and directives influence economic activities. One example is the analysis of the institutional environment at the informal level that represents norms, customs, religion, and the formal level that is home base for the judiciary, polity, contractual agreements, and laws of property (cf. Henisz & Williamson (1999), p. 264). A second example is based on North' framework and examines how institutional elements influence inter-organizational relationship formation and change (cf. North (1990), p. 363-364).

- Further disciplines are political science, rational choice theory, and sociology. Politics brings attention to historical influence of political systems on individuals and their future decisions (cf. Skowronek (1982)). Rational choice theory covers the contractual nature of organizations and economic conditions that influence organizational behavior (cf. Moe (1984)). In sociology, the external view of individuals on institutionalization is examined (cf. Berger & Luckmann (1967); Garfinkel (1967); Cicourel (1968); Zimmermann (1969)).

Any of the listed streams cover inter-disciplinary views on institutional elements, but they are lacking the inclusion of information technology (IT) and their impact on collaborative environments and inter-organizational interactions. With his synthesis of selected theories, Salazar provides an argument for institutional elements in IT-enabled transformation by assessing further disciplines (cf. Salazar (2005), p. 6). Moreover, he introduces a schema that allows the comparison of how research disciplines treat institutional elements in the context of IS research. Similar to the shift of focus from internal to external impulses, Salazar appoints a shift from micro (organizational) to macro (collaborative) aspects as necessary to better assess the role of IT in institutional change (ibid.). With respect to institutional elements, Salazar distinguishes organizations at the micro level, and networks, markets, and industries at the macro level (ibid.). A summary of the key aspects is provided in Table 2.8.

Table 2.8: IT-inclusion in organizations at micro- and macro-levels

Source: cf. Salazar (2005), p. 10-12

	Micro level	Macro level		
	Organization	Network	Market	Industry
Organizational constructs	Organization	Organizational field	Organizational field	Industry-influenced formation of organizations
Institutionalization forms	not provided	Social embeddedness	Market constitution	Industry-wide transformation
Institutional forces	Intra-organizational structures	Regulations and markets driving collaboration formation	Market mechanisms that constitute market	Markets driving competitive footprint of an industry
Role of IT from a strategic-management, socio-organizational, and institutional perspective	IT affects transaction and production costs, influences resource dependencies, supports and enables corporate strategy, and triggers socio-organizational change	Inter-organizational systems trigger institutional arrangements and transform contexts	IT has inter-personal focus, and embraces user centric applications	Industry related IT applications trigger productivity and adoption on industry and enterprise level

From a strategic-management point of view, research themes at the micro level are mostly concerned with transaction and production costs topics. Concerning an organization's supply chain and manufacturing capability, organizations seek to outperform their competitors. An organization becomes successful if it does not only obtain an equilibrium of own and external resources, but if it is capable to be least dependent on externally provided essential resources (cf. Zacharia & Mentzer (2004), p. 189-191). Resource dependency based studies found that the greater the availability and accessibility of resources are the more powerful and successful an organization becomes. In socio-organizational research, organizational forms and the interplay with IT development are in focus. The emerging role of IT and its influence on procedures and activities are being observed from the viewpoint of interaction between IT context and activities.

At the macro level, Salazar takes into account three distinct forms: networks, markets, and industries. The industry is looking at IT-enabled support from the end-to-end process management perspectives and the transformation potential of an industry. Actor-network analysis tools support the socio-organizational aspects of industrial

collaboration. More interesting, markets and networks are merely distinguished by the focus on interrelationships and interactions. Unlike networks, markets focus on the constitution of a market and on the role of IT means in market-relevant activities such as ordering and delivery. Salazar points to the constitution of organizational fields and their similarities to markets. Networks appeal more to the organizational field in institutional theory because of their composition of distinct actors at different levels and the interaction-triggered connectivity among the actors. Though Salazar does not explicitly refer to networks as organizational fields, he points out the relevance of interrelationships and interactions in networks. Strategic management theory accounts networks for collaborative alliances. Still, formation based analysis of networks is missing in that discipline as well. From a socio-organizational point of view, networks are virtual organizations that differ in formation and constitution from the institutional network form. Networks turn then into communities that form a social interest among the network participants.

To sum up, the institutional assessment of collaborative environments fits to networks and markets. Herein, IT-enabled networks are more likely to be subject to research studies than markets. One of the main reasons is that market driven research lacks the reflection on interrelationships and interactions among actors. Networks on the other hand emphasize the relevance of interactions among actors and the relevance of legitimacy in case of regulation-imposed institutional forces. In addition, the inter-disciplinary aspect of assessing the research subject from different views is beneficial to the evolvement and emerging role of IT transformation in collaborative environments. Moreover, regulatory influence grants a major impact on IT transformation. Thus, networks become the preferred institutional research setting for B2G collaboration.

2.4 Choice of Research Methods for Institutional IS Research in this Work

An assessment of research methods that point to rigor and relevance of conducted IS research forms the basis for this section. The assessment was conducted by Palvia et al. and introduced to the Association for Information Systems (cf. Palvia, En, Salam, & Soliman (2003), cf. Palvia, Leary, En, Midha, Pinjani, & Salam (2004)). Next, this section elaborates the conditional framework for the application of the research method in this work. Finally, the section introduces the research method for this work.

2.4.1 Applicable Research Methods

The study of Palvia et al. attests the usability of distinct research approaches: survey methodology, frameworks, and conceptual models as well as case studies are used in the field of qualitative research (cf. Palvia, En, Salam, & Soliman (2003), p. 2). Both qualitative and quantitative data collection methods and interpretations become equally used following the observation of Palvia et al. Herein, the use of qualitative methods and case studies has been applied in a number of IS relevant studies and research. It applies to survey and interview methods. Multiple methods will support the argument of data triangulation and the acceptance of the research results. Triangulation is defined as "the combination of methodologies in the study of the same phenomenon" (Denzin (1978), p. 291) and distinguishes "within-method" and "between methods" (Jick (1979). p. 602-603). Between methods are used to investigate the same dimension or phenomenon of a case with different methods, whereas within-method uses multiple methods to compare a number of cases.

The relevance and rigor of applied methods is being tested by Palvia et al. in a comprehensive study that comprises seven IS relevant journals and herein 843 articles (cf. Palvia, Mao, Salam, & Soliman (2003), p. 6-8). An update of the study took place to verify the study results (cf. Palvia, Leary, En, Midha, Pinjani, & Salam (2004)). It found entry in subsequent elaborations on the taxonomy of IS research (cf. Wilde & Hess (2007), p. 283). An overview of IS research approaches as proposed by Palvia et al. are presented in Table 2.9 (ibid., p. 3-5). The study result and updated version of Palvia et al. does outline the variety of approaches used in IS research, but does not present the approaches in a structured format. One approach to assort them is proposed by Galliers and Land. They distinguish positivist and interpretive research (cf. Galliers & Land (1987), p. 901-902; Galliers, Markus, & Newell (2006), p. X). Positivist research contains approaches such as theorem proof, laboratory and field experiments, case study, survey, forecasting, and simulation. The interpretive research includes action research, descriptive and subjective approaches. Following Galliers and Land, an influencing factor that steers the selection of the research methods for IS research is the object that is being studied. Further influencing factors are the research question and practical considerations such as access to data and knowledge of the researcher. The study object being an organization, individual users, or an IS application will reveal if a combination of research methods is needed or not (ibid., p. 901).

A detailed explanation to the research approaches and their applicability to the research object of this dissertation is provided in the section 2.4.2.

Table 2.9: Research approaches in IS research

Source: cf. Palvia et al. (2003, 2004), cf. Galliers and Land (1987), p. 900-902

Dissertation relevant IS research approaches	Definition
Survey	Research that uses predefined and structured questionnaires to capture data from individuals.
Case study	Study of a single phenomenon (e.g., an application, a technology, a decision) in an organization over a logical time frame.
Field study	Study of single or multiple and related processes/ phenomena in single or multiple organizations.
Literature analysis and library research	Research that critiques, analyzes, and extends existing literature and attempts to build new groundwork, e.g., it includes meta analysis.
Laboratory experiment	Research in a simulated laboratory environment that manipulates and controls the various experimental variables and subjects.
Field experiment	Research in organizational setting that manipulates and controls the various experimental variables and subjects.
Subjective and argumentative	Research is based on opinion and speculation (cf. Vogel & Wetherbe (1984))
Descriptive and interpretive	Interpretive research is characterized by the understanding of the researcher of the participants' subjective understanding (cf. Carroll & Swatman (2000)). The description and categorization of concepts is subject to descriptive research (cf. Schmidt, Lyytinen, Keil, & Cule (2001)).
Action research	Grounded in practical action, action research aims to solve an immediate problem situation in the observed context. The study object determines the setting of the action research and the level of social intervention. Among methodologies that are applied for action research is the Soft Systems Methodology introduced by Checkland (cf. McKay & Marshall (2000)).

With respect to the research aim to construct, describe, and introduce a procedure model for B2G collaboration, the research focus of this work is design oriented. It takes into account the principles that guide the construction and applicability of frameworks and conceptual models. Models play a significant role in construction-oriented IS research (cf. Fettke & Loos (2004), p. 331). They contain recommendations that become relevant for the organization and design of information systems (cf. Schütte (1998), p. 69). Examples are reference models in the form of process models (cf. Supply-Chain Council (2008); Scheer & Nüttgens (2000), p. 367-368; ACQRA (cf. Marcella (2002)). A model is an image of an original. The image is either similar to the original (homomorph) or identical (isomorph) (cf. Krallmann (2002), p. 32). The model captures hereby relevant characteristics that are significant to the original, neglects unnecessary ("unwesentlich") details, and emphasizes the essential ("wesentlich") elements (ibid.). Furthermore, the application of the model is derived from the purpose of the model and

its potential users. Herein, the researcher mediates the process of observing and capturing the original field of research and transforms it into a model. The interrelationship of the original and the model is dependent on the consciousness of the researcher (ibid., p. 38) and the selected method. Models and procedure models are being introduced in the past decades from distinct views. Procedure models have been identified as those that support the construction of reference models. Procedure models or referred to as "Vorgehensmodell" serve the definition and description of tasks, activities within a task, and the order by which tasks and activities are executed (Stahlknecht & Hasenkamp (2002), p. 215).

The suitability of procedure models in IS research is based on the following assumptions. Procedure models are applied in institutional IS research to examine inter-organizational applications as well as the general conditions under which business and governmental actors design, develop, and use such procedure models (cf. Frank (1997), p. 2). An e-government centric procedure model for example applies to systems engineering, project management, quality assurance, and configuration management (cf. Stahlknecht & Hasenkamp (2002), p. 216). Evaluation criteria that refer to a procedure model should be based on a qualitative, IS-focused framework (cf. Fettke & Loos (2003)). Among the proposed research methods and evaluation criteria, guidelines that are applicable to qualitative research and action research fit best (cf. Baskerville & Wood-Harper (1998); Banville & Landry (1989)). With this respect, IS researchers distinguish the following evaluation approaches (cf. Fettke & Loos (2003), p. 82):

- The empirical evaluation of a model is based on the experience of the observed research field. Examples for empirical evaluation are interviews and questionnaires, case studies and action research (cf. Palvia, Mao, Salam, & Soliman (2003), p. 3-5). With respect to case studies, empirical evaluation takes place throughout a rigorous testing of the research field that contributed to the identification of the research problem and requirements definition (cf. Hevner, March, Park, & Ram (2004), p. 79-80).

- The analytical evaluation of a model is based on analytical, logical conclusions. Guidelines should encompass one or more of the following examples of analytical approaches: descriptive, feature-based, text-based, and metric-based. Scheer and Nüttgens (cf. Scheer & Nüttgens (2000), Rosemann and Schütte (cf. Rosemann & Schütte (1997)), and Hevner et al. (cf. Hevner, March, Park, & Ram (2004) provide examples for analytical evaluation.

- Theory- or discipline-based evaluation is founded on a series of criteria, as for example the units of analysis that derive from institutional IS research. Thus, guidelines are coupled to the referenced discipline or theory. Theory- or discipline-based evaluation could be combined with both analytical and empirical evaluation.

- Evaluation that is based on the simulation of a model is assessing the behavior of the users that apply a model that has been created (cf. Yin (1994), p. 93-96). In this sense, simulation requires the model to be implemented for the duration of testing at least or within a pre-defined period. The selection of users should follow the included user types or actors that are addressed in the model. Applying a behavior-based approach allows to observe actors that are rarely accessible to a research environment or for an entire case study (ibid.).

Based on the previous findings that resulted from the mapping of IS-relevant standards themes to institutional aspects, and the case-study based approach, one potential evaluation schema for this work could contain theory-based, behavior-dependent, empirical, and analytical methods. Following the above-outlined elaboration for each of these methods, Table 2.10 illustrates that empirical and analytical methods could be combined with both theory-based and behavior-dependent methods or any of them. Empirical methods contain field and case studies and experiments. Analytical method are based on artifacts, features, or metrics or be of descriptive or text-based nature. A simplified distinction of theory-based methods are IS-theories or other than IS-theories. Behavior-dependent methods apply simulations. The verification of the evaluation proposal takes place in the next section in which applicable research methods and evaluation guidelines are presented.

Table 2.10: Proposed evaluation schema for the dissertation

		Theory-based	Behavior-dependent
		IS theory-based Other than IS theory-based	Simulation-based
Empirical	Field study Case study Experiment		
Analytical	Artifact-based Descriptive Feature-based Text-based Metric-based		

2.4.2 Selected Research Method

With respect to this work, two elements are found useful that guide the selection of research methods: firstly, research methods that foster the theoretical foundation of organizational and institutional constructs and secondly, research methods that provide guidance to the design of the procedure model. Both are now further elaborated. The connectivity of organizations through institutional constructs is to be made apparent so that researchers and practitioners are able to follow. The availability and applicability of the above-introduced research methods require a streamlined and systematic process that evolves research insights from related work and the case study and results in the construction of the procedure model.

So far, the research methods contribute to the objectives of this work as follows. Survey methods and laboratory experiments are originally used to direct the research towards a specific solution. That contains the risk of yielding the research results ex ante. In addition, one of the characteristics of laboratory experiments is the use of academic personnel that conducts the research and deviate from the real world. With respect to the scope of this work, subject matter experts in the field of trade and standards are needed. Moreover, the observation of the real world is a key aspect to conclude in a procedure model for B2G collaboration. Academic personnel as for example students will not have that expertise and knowledge as required. Compared to laboratory experiments, the outcome of the research result in this work is not conceivable yet. Field experiments and in particular field and case studies point better to the relevance of practitioner oriented needs and subject matter experts in a real-life setting. Moreover, the knowledge attached to the subject matter experts and the observation potential in reality supports the need of rigorously conducted field research. Vice versa, case and field studies need to be executed in a rigorous manner to justify their use and avoid the loss of control in the fields of investigation (cf. Henriksen (2002), p. 57-58). Both dimensions of research, being in control and observing a real-life setting, point to the appropriateness of qualitative research. It is required with the objectives of this work to add a third element of research to retrieve additional data. In this context, Palvia et al. point to the inclusion of interviews and in particular secondary data (cf. Palvia, Mao, Salam, & Soliman (2003), p. 8-9). While interviews are widely used in case studies and attested to be a relevant method, secondary data is less applied and often be restricted to complete already observed phenomena. Secondary data is important to this work because of the need to assess a key element of customs-focused B2G collaboration: the legislation. Interviewees and observed personnel refer to regulatory sources, however are not always aware of the original texts. Thus, literature and secondary data study becomes an integral part of data collection for this work. Palvia et al. raise the concern of outdated,

unavailable and therefore inaccessible secondary data sources (ibid., p. 9). Contrary to that argument, regulatory sources are available through a number of public sources and means: internet sources as for example regulation specific databases that provide online access (cf. European Commission (2001)), and traditionally issued bulletins and publications. This work applies only secondary data as for example regulatory texts and supplementing material that passed legislation and is made officially publicly available. Case and field study research methods familiarize with the case study of this work. By examining multiple organizations and their interactions, the research in this work focuses on the collaborative, inter-organizational part. Intra-organizational events are not observed. Secondary data and interviews accompany, add, and validate the research results from previous findings. Literature analysis is conducted to analyze, critique, and extend existing related work. The choice of research methods in the dissertation follows a recommendation of Fettke and Loos to use a qualitative, IS-focused framework (cf. Fettke & Loos (2003)). Herein, they confirm the applicability of the previously selected research methods for this work (ibid., p. 82-84) (see **Table 2.9**). The assessment of research methods results in the following selection: case study, literature analysis and library research, descriptive and interpretive research. The question remains how to analyze and structure observed inter-organizational parts. In IS research, the interest on sharing and maintaining inter-organizational information is growing compared to the classic approach of an information system to maintain its information (cf. Verharen, Dignum, & Weigand (1996), p. 40). A proposition that is made by Verharen (1997) analyzes the interactions between actors following shared services, processes, and transactions. The analysis focuses on interactions that are described in legal texts and reflect authorized communication and obligations among organizations (ibid.). If the proposition is beneficial to the research objectives should be assessed in the course of this dissertation,

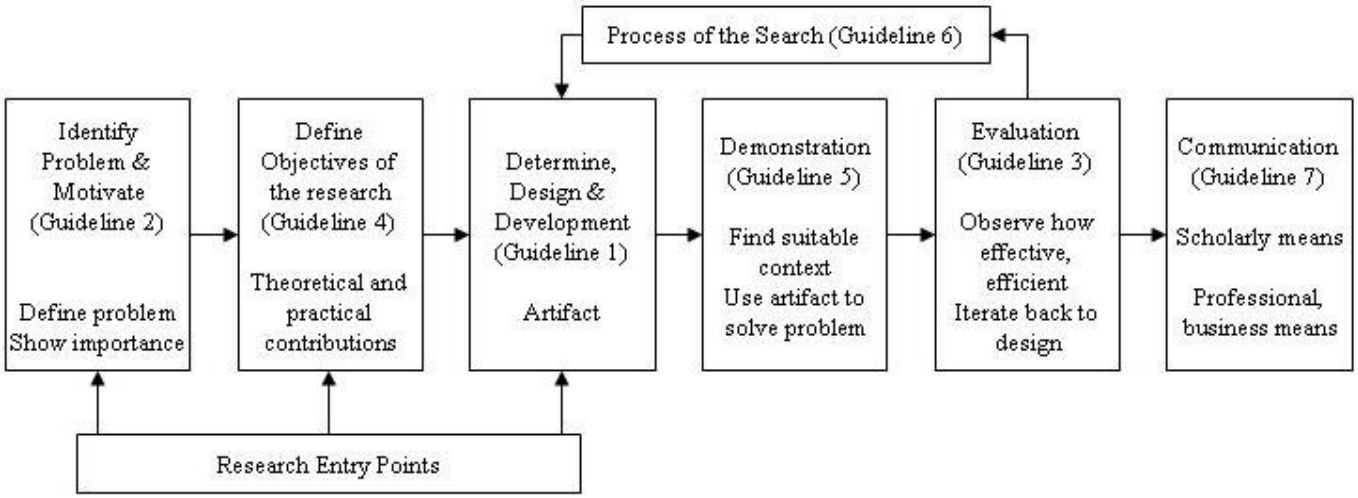
The overall aim to design and construct a procedure model along the case study requires a frame that embraces above-elaborated and selected research methods. The frame applies design principles and depicts construction driven evaluation criteria. The findings and leanings in the case study and the active, yet intermediating role of the researcher will contribute to the refinement of the model. The latter aspect however requires careful observation to remove ‘possible researcher bias and subjectivity’ (cf. McKay & Marshall (2000), p. 110). Not only is it required to conclude in design principles that result from the case study assessment, but also to implement a design-oriented approach that controls external validity, research contributions of the model that attempt to close the scientific and practical gap, and fosters community communication to diffuse the work.

The approach of design science seems appropriate to serve the research expectations and objectives of this work. The reasons are as follows. It offers a streamlined and systematic research process that result in the construction of the procedure model (cf. Peffers, Tuunanen, Rothenberger, & Chatterjee (2008), p. 47-48). Design science proved its usefulness in accordance with rigorous and relevant research in a number of research studies (cf. Hevner, March, Park, & Ram (2004); Markus, Majchrzak, & Gasser (2002); Peffers, Tuunanen, Rothenberger, & Chatterjee (2008); van der Aalst & Kumar (2003)). The design-based approach encompasses seven guidelines the work needs to incorporate. They are as follows (cf. Hevner, March, Park, & Ram (2004), p. 82-90):

- The outcome of the research has to be an artifact in the form of a model (Guideline 1).
- The artifact resolves a technology-driven, relevant business problem (Guideline 2).
- The evaluation of the model is demonstrated through a case study, test-based, analytical, experimental, or descriptive evaluation methods (Guideline 3) in a rigorous manner (Guideline 5).
- The research contributes in a clear and verifiable manner to the theoretical foundation and leverages the potential of institutional constructs (Guideline 4).
- The process of the search for the model includes the construction and verifiable deployment of the procedure model; accompanying task descriptions and role definitions are made available (Guideline 6).
- The presentation of the research and the artifact is conducted in a clear and effective manner and is targeted for scientific, managerial, and technical audiences (Guideline 7).

Illustrated in a similar format as proposed by Peffers et al. the guidelines interact as follows (cf. Peffers, Tuunanen, Rothenberger, & Chatterjee (2008), p. 54) (Figure 2.1). The process of the search facilitates the iteration from the evaluation of the model back to the artifact, to the search and find of a suitable context. Any of the other steps follow one by one and are triggered by the identification and determination of the research entry points. Entry points to research vary by problem-centered, objective-centered, design-centered, to client and context-based entry points. As argued by Peffers et al. the context-triggered research bears the risk of resulting in a constraint for the overall,

generic validity of the artifact (ibid., p. 74). Therefore, a suitable and broader context facilitates the validity of the artifact.



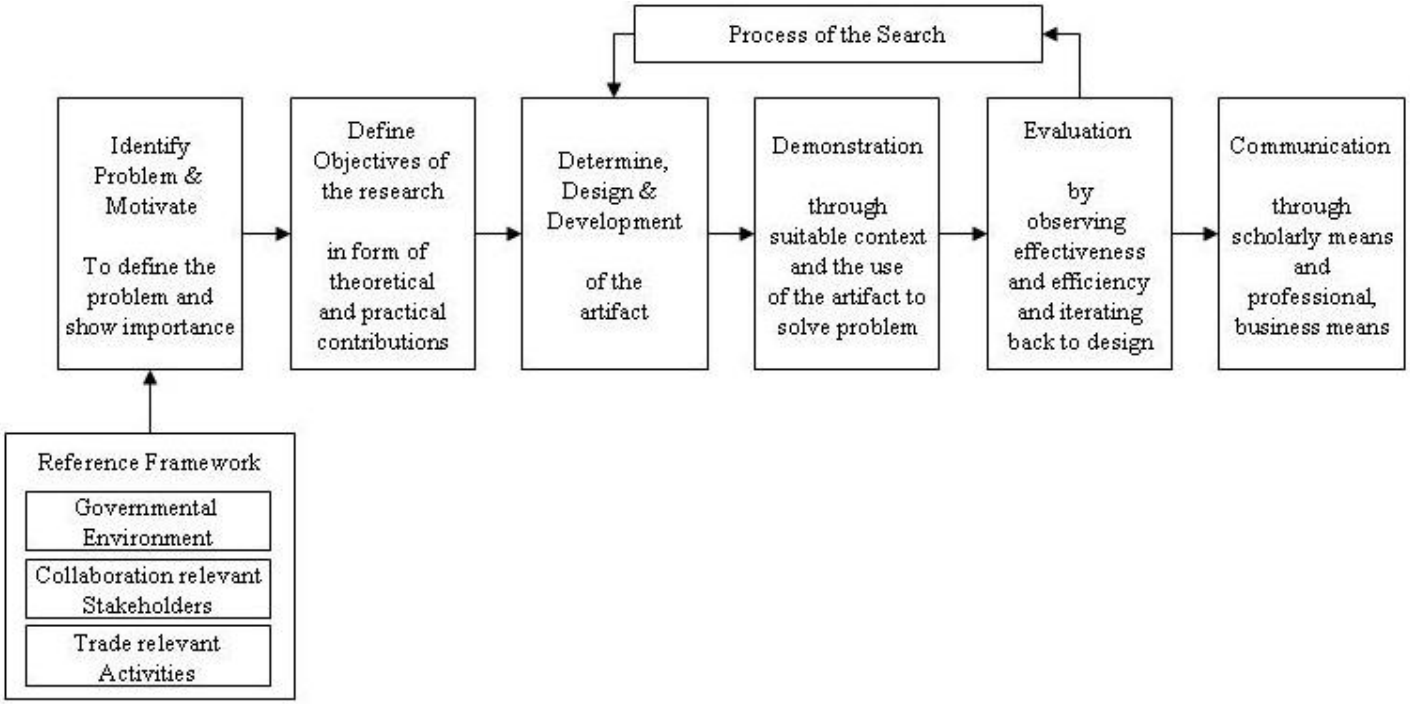
Source: cf. Peffers, Tuunanen, Rothenberger, & Chatterjee (2008), p. 54

Figure 2.1: Design-based research framework

The reference framework embraces three layers: the first of which represents the governmental environment, the second the stakeholders that interact in a B2G network and the third the activities that are related to the physical trade. With that respect, the reference framework triggers the identification of the problem and the motivation (see Guideline 2).

Concerning the artifact, the procedure model, the model-based approach in this work is taken as follows. The original that forms the basis for the model originates from the field of export and role of IS elements such as standards in B2G collaboration formation. The original is an export-based B2G collaboration between two or more countries. The export-relevant collaboration is comprised of interactions, business processes, tasks, and responsibilities. An isomorphic image that describes the entire field of export is not feasible in the scope of this work. The image that is elaborated and designed in this work is homomorphous. Relevant details are determined by the interactions of business-to-government actors and the tools and applications they use. Business-to-business (B2B), government-to-government (G2G), and government-to-citizen (G2C) interactions are regarded as unnecessary and are therefore out of scope of this work. The procedure model aims to derive general conditions for IS- and therefore standard-enabled collaboration. So far, essential elements are defined as elements that determine, influence, prohibit, and steer B2G interactions. Based on findings of the previous sections essential elements should embrace regulations, standard initiation, inter-organizational business processes that describe the export of goods, as well as roles and responsibilities of collaborating organizations. Further elements will follow in the discourse of this work. The overall purpose of the model that is being presented in this work is to become adapted to other originals. It is the aim of this work to point towards users that are involved in collaboration formation, IS engineering, standardization of IS standards, and legislation engineers. Further user types are being elaborated in the discourse of this work. The researcher observes and perceives the reality in the described boundaries of export and applies the model in a homomorphous manner resulting from a selection of three trade-relevant networks (see **Figure 3.5**). The necessary data collection is conducted throughout the previously-assessed research methods.

The design-based research framework for this work then appears as follows (Figure 2.2).



Source: cf. Peffers, Tuunanen, Rothenberger, & Chatterjee (2008), p. 54

Figure 2.2: Design-based research framework for the dissertation

The reference framework initiates the research process. Trade relevant matters in business-to-government (B2G) collaboration stimulate the elaboration of theoretical contributions and practical implications. The procedure model as core element of the research is to be investigated in the surroundings of the reference framework. The elements of the procedure model are then elaborated. The evaluation of the procedure model and the communication of the research results are following. With respect to the evaluation of the procedure model, Hevner et al. express their expectations in the evaluation process as follows (cf. Hevner, March, Park, & Ram (2004), p. 28-30):

- evaluation is to compare and contrast the procedure model with other models or respective evaluation criteria
- evaluation is to meet the claimed collaboration and stakeholders' needs
- evaluation is to study the fit of the procedure model with the real-world setting
- evaluation is to demonstrate theoretical and practical contributions, thus utility, and
- evaluation is to communicate clearly the results and their reuse.

The verification of the evaluation criteria and the elaboration on the research methods result in the design science driven research approach of the dissertation. Following the proposed evaluation schema (see **Table 2.10**), the chosen approach is highlighted in grey (Table 2.10).

Table 2.11: Research approach of the dissertation

		Theory-based	Behavior-dependent
		IS theory-based non-IS theory based	Simulation-based
Empirical	Action research Case study	Institutional theory grounded case study on B2G collaboration formation in selected real-life settings	Not applied
Analytical	Descriptive Feature-based Text-based Metric-based	Design principle based (descriptive) evaluation of the procedure model for B2G collaboration formation	Not applied

2.4.3 Applied Terms

Concluding the selection of research methods in the previous Section 2.4.2, the entry to research in this dissertation is a proposition of an objective-centered solution. The solution is about assessing the role of standards in B2G trade. Embedded in a reference framework the dissertation gathers different aspects around B2G, studies of distinct, namely three B2G networks are used. The dissertation applies the terms ‘reference framework’, ‘case’, ‘meta model’, ‘activity’, ‘task’, and ‘role’ as follows. Further terms are introduced in subsequent chapters based on the results of the research.

Reference framework:

> A reference framework is a generic model of customs-related B2G collaboration. It takes into account (1) the regulatory environment, (2) stakeholders that participate and / or become affected in B2G collaboration, and (3) the trade chain. (1) The regulatory layer concerns how legislation influences stakeholders and the trade chain. (2) Apparent stakeholders are business and governmental actors. (3) The trade chain results in operational customs-related activities for each of the stakeholders.

Case:

> A case is an instance of the reference framework. A case could focus for example on a specific industry, an export-import combination regardless the geographical position of the exporter and importer or size of the exporting and importing enterprises.

Meta-model:

> Outputs that are generated within a case are outlined in a semi-structured meta model. A meta model sets into relationship stakeholders, activities and tasks. The meta model describes the mean by which stakeholders exchange collaboration-relevant and customs-specific information and data. It covers all elements that are required to set into relationship the stakeholders. Therefore, intra-organizational activities or those that are conducted outside the customs-specific collaboration are excluded from the meta model.

Activity:

> An activity is a process step, a function or part of a function that is conducted by one or more stakeholders in the collaboration. A task comprises one or more

activities based on a common denominator as for example strategic, operational, or planning activities. Both activities and tasks generate outputs as for example concepts, specifications, or a report. Stakeholders participate in activities and tasks based on their roles. Examples of a role are manufacturer, declarant, or logistics service provider. Thus, the position and degree of collaboration involvement are determined by the role a stakeholder withholds in the chain of activities. In this dissertation, a role is carried out by an individual or an organization.

Table 2.11 summarizes the terms.

Table 2.12: Definition of key terms of the dissertation

Term	Definition
Reference Framework	A reference framework is a generic frame for customs-related B2G collaborations It considers three key aspects of B2G collaboration: (1) the governmental environment, (2) stakeholders that participate and / or become affected in B2G collaboration, and (3) the trade chain
Stakeholders	Actors as for example business and governmental actors that participate in a customs-related collaboration as for example export
Case	A case is an instance of the reference framework
Meta model	A meta model sets into relationship stakeholders, activities and tasks
Activity	An activity is a process step, a function or part of a function that is conducted by one or more stakeholders in the collaboration
Task	A task comprises one or more activities based on a common denominator
Role	A role reflects the position and degree of collaboration involvement of a stakeholder in a chain of activities

2.5 Summary

This chapter provided the reader with an introduction into standards research, the embeddedness of standard themes in IS research, and the institutional viewpoints in IS research. Moreover, it derived the research approach for this work. The most relevant insights from this chapter are as follows:

- IS standards research can be seen as a part of IS research. The lifecycle of standards consists of initiation, development, deployment, diffusion, and discontinuation. IS standards research covers a much broader spectrum than traditional IS research that focused on diffusion and deployment of IS standards. The lifecycle-based approach coincides with disciplines as for example organizational and strategic management

and new institutionalism. Herein, IS standards research themes benefit from inter-disciplinary viewpoints, namely institutional, socio-economic, and strategic decisions. The choice of IS research discipline depends on which lifecycle stage of standardization is in focus. In this dissertation, the focus is on the institutional aspects of standardization. The emerging use of institutional theory as reference disciplines appreciates the use of micro, meso, and macro levels of analysis. The micro level concerns individuals as for example constituents and users. At the meso level, research focuses on intra-organizational, micro level of analysis. The level of analysis for the dissertation's objectives is the inter-organizational, macro level of analysis.

- The institution-based view is the theoretical foundation in this dissertation. Notable contributions of related work underpin the role of institutional forces and organizational constructs for IS research in B2G collaborations. Herein, institutions are binding elements that tie-up organization-organization and individual-individual relationships. Composed of cultural-cognitive, normative and regulative elements, institutions represent common beliefs and logics of action (cultural-cognitive pillar), certifications and accreditation based norms (normative pillar), as well as rules, laws, and sanctions (regulative pillar). Institutions are for example regulative forces that guide organizations in their internal and external business activities.

- Actors are in general distinguished by businesses and governmental institutions. The levels of inter-organizational collaboration refer to linkages that connect alike or disjunctive organizational units of analysis. The work of institutional theorists help to approach organizational constructs as relevant for the inter-organizational B2G perspective of this dissertation. The concept of institutionalization is applied to assess organizational constructs agree and implement formal structures such as procedural routines and processes. Organizational constructs are capable to establish institutions and accommodate themselves to institutional behavior. More importantly, the process of institutionalization accelerates once organizational constructs increase their competitive footprint and cultivate institutional forces in their collaborative environment better than organizations that are not capable to respond timely enough to governed forces.

- Inter-disciplinary research as aimed for in this dissertation requires a careful selection of the research method. Empirical and analytical research methods are found applicable. These should be of qualitative nature: frameworks and procedure models, case and field studies, speculation, literature analysis, secondary data, and interviews. Procedure models are applied in institutional IS research to examine

conditions under which actors interact. The model is the reflection of the original in a homomorphous manner. Originals that comprise distinct actors at distinct levels are reflected in a homomorphous.

- Serving the complexity of institution-based IS research a choreographed use of research methods is required to respond to the above-outlined research needs of this dissertation. Framed in a design-driven, qualitative approach, the artifact of this work is elaborated through an iterative evaluation of determination, design, development, and demonstration of the procedure model. The process of the search is steered by practical and theoretical needs in the field of business-to-government collaboration for customs. The introduced reference framework triggers the research objective of this work: to develop a procedure model for standard-enabled B2G collaboration. Case study are an appropriate mean to examine inter-organizational collaboration. Secondary data and interviews should be used. In addition, literature analysis serves to analyze, critique, and extend existing related work.

To sum up, the dissertation builds on the theoretical fundament of institutional and IS standard-based IS research. The construction of a procedure model, the core element of this work, will pursue design-based research principles.

3 The Reference Framework

3.1 Introduction

To respond to the previously outlined research objectives a reference framework is now introduced that gathers different aspects around B2G. The reference framework allows for assessing and classifying observations and provides the basis for collecting information and data needed. Overall, the reference framework is the basis to assess, develop, and construct research results (Figure 3.1).

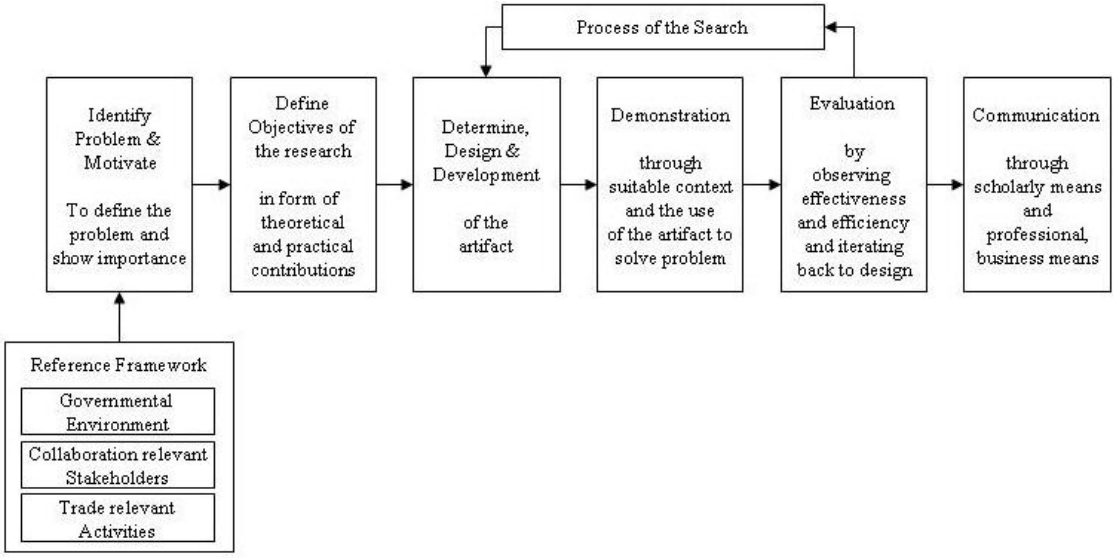


Figure 3.1: Reference framework that is serving the research framework

The present chapter is concerned with the demonstration of a suitable context of the envisioned design result. The remainder is structured as follows. Section 3.2 describes the reference framework and the case that is applied in the dissertation. The reference framework serves as research entry point to illustrate the motivation and the problems concerned with standard-enabled B2G collaborations in export. Herein, the chapter introduces the parameters applied to select a proper case, collect and code the data. Section 3.3 is dedicated to the selected case and Section 3.4 contains the diagnosis of B2G collaborations and relevant elements for the design of the artifact. A summary of the Chapter is given in 3.5.

3.2 The Reference Framework in Detail

3.2.1 The Reference Framework of Export from EU to Non-EU Countries

Export is an apparent frame to assess the role of governmental actors in customs management. So are regulatory and procedural guidelines on the European level that depend on governmental actors. Prime sources of export and customs in this research refer to European regulations, in particular the Modernized Customs Code (MCC) and the Multi-Annual Strategic Plan (MASP), and on global level the Revised Kyoto Convention issued by the World Customs Organization. Further sources of export and customs are provided in addition in the relevant sections.

Regardless the geographical starting point of an export process, cross-organizational export chains enclose a number of national and foreign stakeholders and refer to a number of customs-relevant activities. Among potential stakeholders, an export process encounters the involvement of non-governmental authorities, customs authorities, manufacturers, service and logistics providers, as well as authorities that issue and handle certificates. The export process from an EU to a non-EU country is composed of customs activities covering export and import declarations, declaring, governing, and informing activities. Publicly shared processes are those that focus on the intersections of the above-mentioned stakeholders. Supported by regulatory requirements, stakeholders stress the use of standards in form of standardized process and data exchange (cf. TAXUD (2004), p. 4-5). The reference framework that takes into account these intersections looks as follows (Figure 3.2).

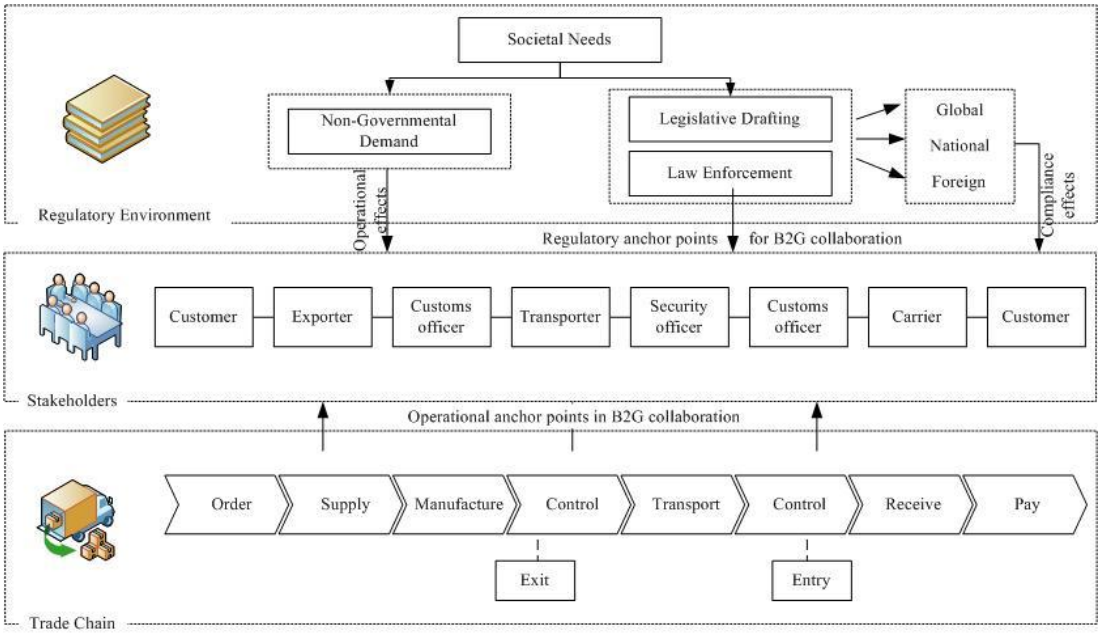


Figure 3.2: Reference framework of export and customs in particular

Hereby, the reference framework consists of three layers: the first of which represents the governmental environment, the second the stakeholders, and the third the activities related to physical trade. Within the governmental layer, governmental authorities respond to trade relevant societal needs such as legal, compliance, privacy, and security measures, as well as governing and regulating human's welfare and wellbeing. Stakeholders in trade are business and governmental actors. Influenced and steered by the governmental environment, stakeholders experience law enforcement from national and foreign legislation. Furthermore, they are confronted with non-governmental, operational related demands. Activities and tasks that embrace the trade chain lead to further operational activities for each of the stakeholders. The intersection between government and business is apparent in the trade chain, mainly due to border-crossing ('exit', 'entry') relevant activities. The reference framework illustrates that any stakeholder participating in the collaboration should have an overview of governmentally enforced and non-governmentally influenced demands. Moreover, the integration of operational and legal activities in an export chain requires being aware of other stakeholders that are involved.

3.2.2 Criteria for Case Selection

The reference framework of export in this dissertation is the basis to assess, develop, and construct research results. It gives room for characteristics of variables and

phenomena in each of the fields of investigation. Within each of the fields of investigation, sources are retrieved that are relevant, appropriate, and contributing to the overall research need (cf. Benbasat, Goldstein, & Mead (1987), p. 373-374). The single-case study is an overarching case that meets the identified research needs and challenges the institutional theory (cf. Yin (2003), p. 8). Structures and processes within an overarching case should link activities of participating stakeholders to the context in which they interact and collaborate (cf. Pettigrew (1990), p. 270).

Concerning data that supports the research need and the theoretical concept of the reference framework a use case should fulfill a set of criteria. All criteria need to be framed within a topic that is subject to recent inter-organizational challenges. The criteria and explanatory details prove their fit to the reference framework as follows (Table 3.1).

Table 3.1: Criteria to select use case

Criteria	Fit to select a case
Governmental and non-governmental business actors are involved	To assess B2G collaboration, governmental actors have the same weight of interactions in the collaboration as non-governmental actors and are directly connected to non-governmental actors. Non-governmental actors are business partners. Collaboration takes place bi-directionally: government-to-non-governmental (G2B) and non-government-to-government (B2G).
Regulation and legal texts are released and accessible	To consider regulation based B2G and G2B collaboration regulations need to be accessible and made publicly available to any of the collaborating actors.
Inter-organizational activities take place	Actors develop, share, and exchange tasks concerning strategic, operational, and planning activities.
B2G scenario is applicable on a global scale	Inter-organizational activities can be transferred to another country or region. This expresses the need to consider generic applicability of the research result.
IT is recognized as a potential mean in inter-organizational activities	Information technology is recognized as a mean to steer, stimulate, or support inter-organizational activities. IT applicability is one of pre-conditions of electronic enabled B2G and the underlying research proposition.

3.3 The Selected Case

3.3.1 Background and Reasons for Selection

The case study that has been chosen to meet the above-introduced selection criteria was conducted within the integrated project ITAIDE (nr.027829). ITAIDE is funded by the 6th Framework IST programme of the European Commission (ITAIDE (2009)). At

ITAIDE, “the research setting is an action research architecture […] to study development to research for lead implementations of electronic documents for public administration focusing on e-Customs in selected industries. In particular [each sub-project] [referred to as Living Laboratory] focuses on pilot implementations in industries where [project] […] principles can provide considerable gains in efficiency, administrative load reduction and increased visibility for security purposes. [Each sub-project investigates certain aspects in e-customs procedures] “ that are under development in line with the long-term EU strategic objectives about improved security and administrative load reduction“(ITAIDE Consortium (2008), p. 32). The strategic objectives at ITAIDE refer to

- Industry or product based implications on B2G (excise goods, dairy and milk products, paper and mill products, and pharmaceutical products),
- Human health and safety requirements in international supply chains concerning safe trade and shipments as well as product safety following product-dependent requirements, and
- Influence of regulations on international supply chains and business-to-government interactions and cause-of-actions through the introduction of the Modernized Customs Code and the MASP.

The author of the dissertation worked as an active project member in the ITAIDE project team from August 2006 to September 2009 and was in charge of the research activities for standardization. Among further research themes, ITAIDE investigates cross-border management from EU Member States to non-EU States of countries and organizations that formed the ITAIDE consortium and participated in the project. The research environment that is needed to conduct the research objectives for this dissertation has been found in ITAIDE. The research study within ITAIDE fulfills the above-outlined selection criteria as follows (Table 3.2).

Table 3.2: Fit of institutional factors to the selected cases

Institutional factors	B2G Collaboration characteristics of ITAIDE (including denoted examples for further detailing)
Institutional, regulatory, and market driven changes	Driven by trade facilitation and compliance needs and legally imposed through European legislation
World system, Societies, Organizational fields and population, Organizations, and Organizational units	Business organizations (manufacturer, logistics service providers), governments (Denmark, The Netherlands), governmental authorities (customs, tax), and non-governmental authorities (WCO, UN/CEFACT)
Actor types that fulfill network initiation needs	Organizations are legally independent and are equal
Goals, rights, responsibilities, and activities for actor types	Dependent on cross-border management
Polycentric access	Access is unlimited and multiple: organizations are free to trade products in any region as long as regulatory and security measures are met; governmental partners access network based on legal mandate
Horizontal, vertical, and cross-level coordination	Horizontal coordination (customs authorities and business partners collaborate i.e. cross-country) and among business partners (logistics service provider collaborates with service provider to exchange certificate relevant information); cross-level coordination takes place among local and EU authorities and organizations
Regulative and normative linkages	Binding elements such as regulation and trade oriented, task oriented, role and authority based structures
Institutional, functional, and technical facilitators	Globalization and trade challenges, competition in markets, regulatory impact, cross-border IS

The project setup of ITAIDE covers distinct cases that relate to export related activities from Denmark to Russia, the Netherlands to the United States of America and from Finland to Russia. Three cases have been selected that form the basis for this research to observe real-life customs-relevant settings. The selection of countries for this dissertation resulted as well from a pragmatic reason that the corresponding actors in these countries participated in the research project in which the author participated. Figure 3.3 illustrates the three cases of B2G collaboration in customs dedicated to (a) the export of dairy products, (b) the export of excise goods, and (c) the export of paper and mill products.

Figure 3.3: Observed real-life settings

The questions that motivated the author to focus on these cases (a), (b), and (c) are the following two: (1) will the cases reveal identicals or exceptions in the business-to-government (B2G) collaborations, and (2) how informative are these cases for the entire field of B2G collaborations.

Addressing the first question, the cases concern small countries, the Netherlands, Denmark, and Finland. Is it expected that countries that are small thus flat in the governmental structure require less transaction processing complexity and therefore provide easier access to subject matter experts and information. A rather complex governmental structure as for example the German government required access to federal and multiple sub-federal units that are less comparable to small countries than the three selected exporting countries. On the receiving end, the selected import countries, Russia and the United States, represent two diverse institutional perspectives. Russia as one of the transition economies undertook a fundamental transition with the fall of the Iron Curtain in 1989 (cf. The World Bank (1996)). Among other characteristics, the communistic system is characterized by a sustained period of controlled and substantial governmental bureaucracy (cf. Kornai (1992)). Bureaucratic control in customs management is characterized by a central planning system and the use of bureaucratic and central control to coordinate between govermental actors and between governmental and business actors (cf. Ericson (1991). In contrast to Russia, localized processing, actor-driven control and the focus on the economic value for the individual actor are key characteristics of capitalistic countries and in particular the United States as “leading Western economic power with a capitalistic ideology” (Ralston, Holt, Terpstra, & Kai-Cheng (1997), p. 8). With that respect, the workplace philosophy in customs management might range from controlled bureaucratic processing to an economic-driven business processing.

Addressing the second question, the cases do not interact in similar but diverse industries. These are dairy and milk industry, paper mill industry, and the beverage industry. The beverage industry in this context is subject to the study of excise tax that is being charged in international trade. The study of customs processing might reveal similarities among the three industries but also point to differences in transaction and information processing. Moreover, observations might address differences in customs processing based on the observed products. So far, the complexity in the product processing for dairy and excise goods in case of export from Denmark and the Netherlands is perceived higher than in case of simple products such as paper mill products that are being exported from Finland. The complexity of food logistics per se is subject to a study of the European Food Industry (cf. European Communities (2007), p. 36). The implications of excise-related regulations on trade are subject to further research studies (cf. Cnossen (2002) (p. 17). In contrast to dairy and excise goods, paper mill products are rather simple. However, the paper mill industry is entering a stage of transformation to a low carbon economy and is therefore seeking efficient and low-cost production and transaction processing among other fundamental industry-specific (cf. Koskinen & Hilmola (2008)). The study of the three cases will reveal if a transformability of three cases to the entire field of customs management is possible (cf. Yin (1994), p. 37, 50-51); (2008), p. 25-66). Herein, it is expected that the research study differences and commonalities among the cases.

To sum up, the research case study is comprised of three cases on customs management activities. Where evident, the author will point to national differences. Details that refer to regulatory requirements on European level and in a broader, more global context are detailed in the course of this and the following chapters. Named two case-centric questions triggered the research setting and steered the presentation of the research results in the following sections.

3.3.2 Regulatory Environment of the Selected Cases

The reference framework of the study resides in the European Multi-Annual Strategic Plan (MASP) of the Modernized Customs Code. The characteristics of the governmental environment for the selected case are now further described and portrayed in Figure 3.4. Figure 3.4 depicts the regulatory environment in an unformatted flow chart. Boxes represent actor types: WCO, customs territories referred to as countries, the European Union, and the EU member states. The illustration names the main governmental (regulations, directives) and non-governmental (conventions) releases in

form of text boxes. Further content is provided in form of text boxes, too. Arrows specify the direction of interactions.

The European Union decided to cope with customs related challenges by redesigning legislation through the so called Modernized Customs Code (Taxud (2004)). The Modernized Customs Code replaces the Community Customs Code (European Commission (1992)). The MASP introduces a series of IT applications that aim to reduce the administrative burden of trade transactions and to increase security and control relevant mechanisms. Applications are grouped together as e-customs applications (cf. European Commission (2006b), p. 607-608) and are as follows. The New Computerized Transit System (NCTS) and its focus on risk management are the foundation for an electronic customs declaration environment by adding systems for Import (ICS), Export (ECS), applying the International Road Transport Convention for Transit (NCTS-TIR), and including the Authorized Economic Operators' registration and identification system (AEO). The European Commission releases expectations and guidelines for the Economic Operators' registration, identification, and authorization. The Modernized Customs Code is the legal basis for the MASP and describes aspects, expectations, and arguments for an electronic environment in governmental and business organizations (cf. TAXUD (2004), p. 489). Projects underneath the Modernized Customs Code result in the deployment of a fully automated export (AES) and import system (AIS), and an Integrated Tariff Environment. An acceleration of the customs activities is also accepted by establishing a paperless environment for customs and trade through a single window that gives access to customs relevant data to the involved business and governmental actors (Single Window Access, henceforth SWA) (cf. European Commission (2006b), p. 488).

The choreography of national and European customs legislation resides within the European regulatory frame. Herein, the EU Government released the European Community Treaty (Article 133) (European Commission (2009)) and the internal regulation on paperless environment for customs and trade (SEC (2005) 1543). Amended to SEC (2005) 1543 is the MASP and the e-Government model embracing a number of IT applications and further activities. Non-governmental releases embrace the Kyoto Convention (WCO (2000)) and its elements: the SAFE Framework of Standards including the WCO Data Model (WCO (2007a, 2007b)), and the Kyoto ICT guidelines (WCO (2004)). The e-Government model subsumes projects and amendments of the MASP needed to disseminate and execute upon the EU wide regulation on Paperless Environment for Customs and Trade. In the context of the Revised Kyoto Convention, WCO refers to customs unions as in the case of the EU

customs territory and the customs territory of individual EU member states such as Denmark. The EU itself and EU member states such as Denmark are both members of the WCO. The adoption of guidelines that have been released by the WCO is regulated within the membership agreement at the WCO. The deployment of WCO released guidelines itself is dependent on any members' deployment strategy. The transposition from WCO released Kyoto Convention resulted in the adoption of the General Annex in the EU, not in the adoption of the Specific Annexes.

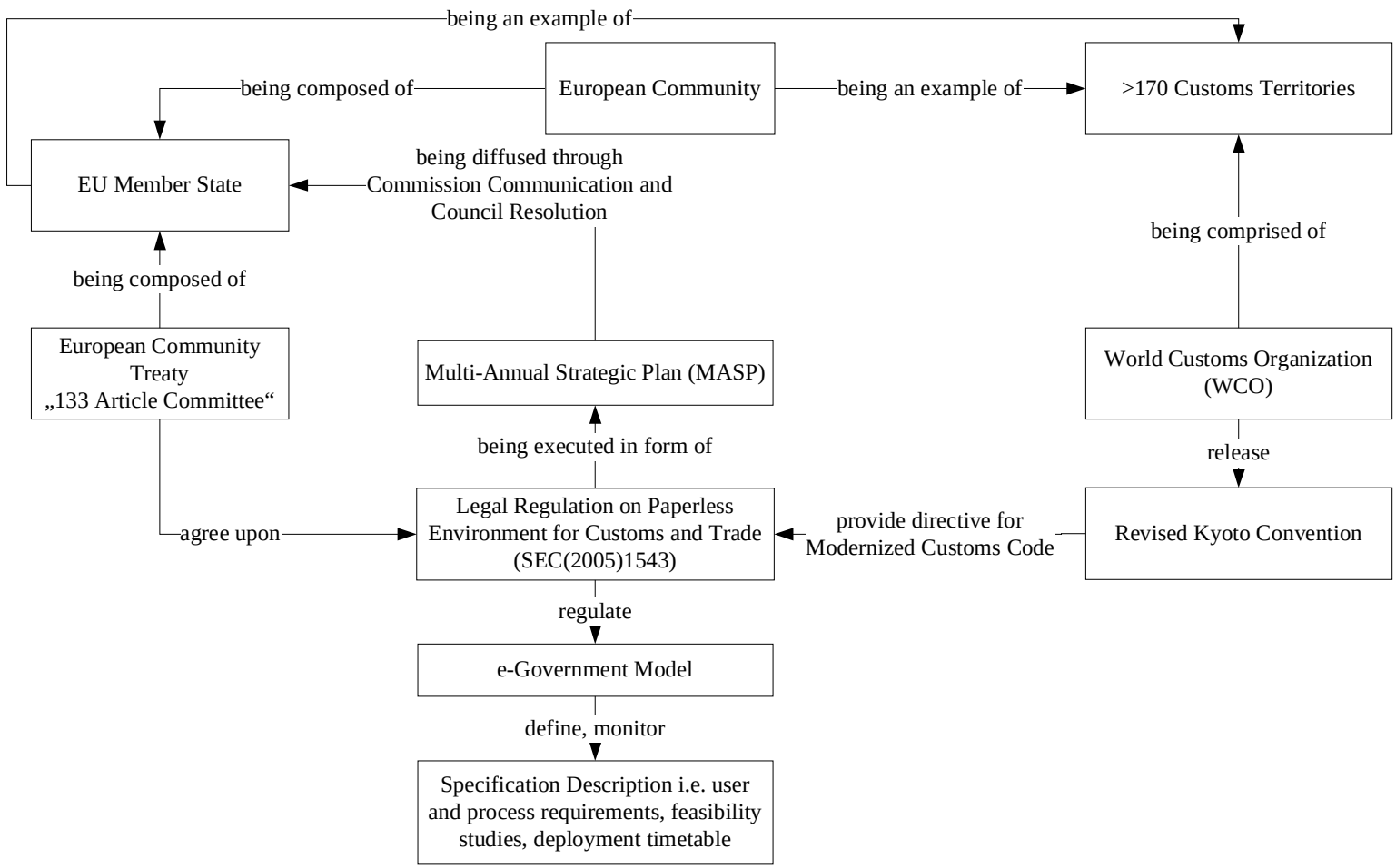


Figure 3.4: Regulatory environment of customs for the case study

3.3.3 Data Collection and Data Coding

The data collection within the case study was conducted as follows. Sources of data were systematically collected, organized, and transcribed. Following the principles of qualitative data-collection, qualitative data is assessed based on relevance, validity, and transferability (cf. Benbasat et al. (1987), p. 373-375). The data collection included direct observation, participating in formal and informal meetings, visiting organizations, attending work and project meetings, conducting semi-structured interviews, reviewing officially made available text and data sources. Notes for personal use included unstructured data and personal impressions. Those were revisited after each meeting and visit. Furthermore, interviews with standardization experts complemented observations made. Interviewees were appointed by ITAIDE project partners. Interview guidelines are attached in Table A.9.7 (see **Table A.9.7**) and an anonymized list of interviewees in Table A.9.8 (see **Table A.9.8**). Transcription guidelines and structure are attached in Table A.9.9 (see **Table A.9.9**) and the list of key actor roles in the study is added in Table A.9.10 (see **Table A.9.10**).

The field research was conducted from August 2006 to July 2009. Data collection resulted in a large number of qualitative data assessed such as regulatory sources and supplementing material, as well as transcripts from interviews, meetings and workshops. Coding of descriptive text was conducted for regulatory sources and transcripts. Structures and substructures were used to ease material coding (Table 3.3).

Table 3.3: Qualitative data analysis

Category	Subcategories
Collaboration initiation	
Legislation needs	Assessment of B2G relevance in national and foreign legislation Regulatory compliance need to get access to market
Market needs	Activities to decide upon market entry
Collaboration needs	Conduct stakeholder and collaboration partner analysis Assess actor characteristics and profile Analyze actor requirements Define collaboration characteristics following criteria from **Table 3.2**
Collaboration formation	
Organizational factors	Determine depth and width of organizational levels involved in B2G Assess actor types that are apparent on each collaboration layer Determine modes of collaboration / network access Assess modes, drivers, and limiting factors in collaboration formation on same- and cross-levels Document directions of collaboration
Institutional factors	Document regulatory linkages and their characteristics Document other than regulatory linkages Assess content of collaborating activities and public process elements Follow limiting, and promoting factors of IS standards usage

3.4 Diagnosis of B2G Collaboration in the Case Study

3.4.1 Actors, Processes, and Regulations

The case study investigates the impact of the MASP twofold. Firstly, it investigates procedural aspects of electronic cross-border management: product category based procedures, security- and control-imposed procedures. Secondly, it retrieves business and governmental requirements for electronic customs management. To concentrate on these two aspects, the case study excludes the investigation of any financial implications for and financial obligations of participating actors. Figure 3.5 gives an overview of the two relevant aspects (1) and (2). It sets into context the two aspects with the real-life settings that are fields of investigation in this dissertation.

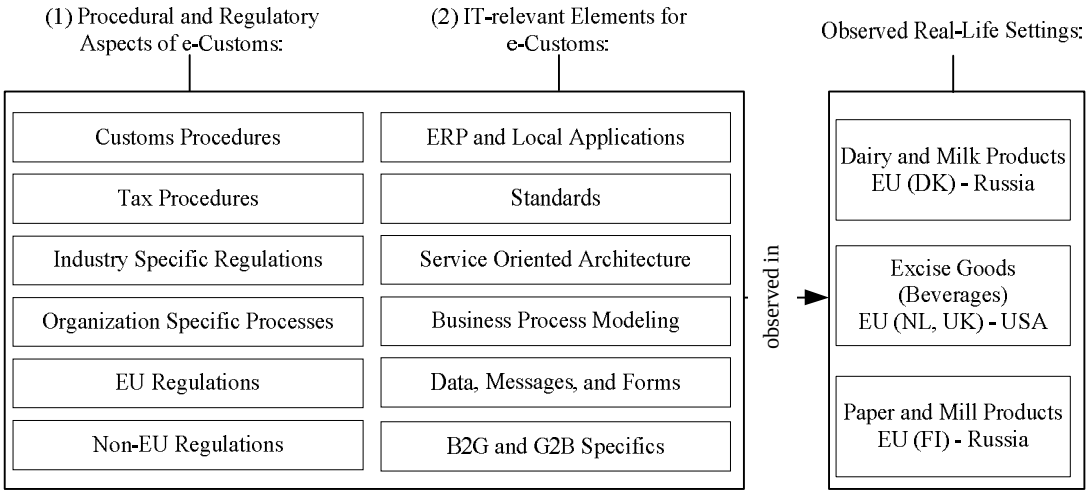


Figure 3.5: Research topics observed in the case study

The analysis of (1) procedural aspects in electronic customs results in three procedural categories and the analysis of (2) IT-relevant categories (Figure 3.6). Each of the categories for (1) and (2) are listed side-by-side in form of consecutive text boxes. The boxes are not interrelated with each other, but arranged by this provide a better readability. Addressing aspect (1), procedural categories differ by product, security, and control aspects. Concerning aspect (2), IT-relevant categories distinguish application, design, and content specific aspects. Herein, standards and architectural design elements are sub-categories of design. Now, actor-actor relationships appear in a number of variants. The inner table in Figure 3.6 indicates those actors that count as relevant for each of the categories. For example, control-imposed procedures refer to business as well as governmental relationships. Control procedures take place between businesses (B2B), between governmental authorities (G2G), and in a B2G relationship. The linkage between procedural and IT-driven requirements for e-Customs is subject of further research.

Procedural aspects / IT-relevant categories	Product-category based	Security-imposed	Control-imposed
Application-triggered			
Design-imposed			
Content-triggered			

Actor-actor relationships	Business	Government
Business	B2B	B2G
Government	B2G	G2G

Figure 3.6: Fields of investigation and covered actor-actor relationships

3.4.2 Observed Actors

The real-life settings that are subject to the study (Figure 3.6) are denoted as network a), b), and c) and are characterized by the following characteristics: actor roles and industries observed (Table 3.4).

Table 3.4: Observed networks and analyzed characteristics

Observed networks	(a) Trade network Denmark-Russia	(b) Trade network NL-UK-USA	(c) Trade network Finland-Russia
Observed product	Dairy products	Beverages	Paper and mill products
Observed actor roles	Manufacturer Farmers External lab National Government EU Government Declarant Consignor National customs and tax National statistics Non-EU customs and tax authorities Foreign embassy Chamber of commerce Health authorities Veterinary Specialist Service providers Logistics service provider Consignee	Manufacturer Declarant Consignor National customs and tax National statistics Non-EU customs and tax Service provider Logistics service provider Consignee	Manufacturer Declarant Consignor National customs and tax National statistics Non-EU customs and tax Service provider Logistics service provider Consignee
Observed industries	Dairy products Public Services Financial Services and Banking Logistics and Transportation Healthcare Services Certification and Inspection broker	Manufacturing Public Services Retail & Wholesale distribution Logistics and Transportation Certification and Inspection broker	Mill processing Public Services Logistics and Transportation Certification and Inspection broker

The roles of actors involved in the networks are listed below (Table 3.5): actors aggregate to actor roles in case they were apparent in the studied trade scenarios and

conducted a similar set of activities. Entries in Table 3.5 refer to legally independent organizations unless indicated differently. The table lists actor roles and gives a brief description. The right-hand column names participants that are involved in the study and represent the actor roles in the collaboration. The participants are listed in an anonymized format. Anonymity is a result of mutual and contractual agreements that formed the basis of research in the ITAIDE project and the provision of confidential information to the author.

Table 3.5: Observed actors and analyzed characteristics

Actor roles	Activities conducted by actors	Participants (anonymized)
Customs office of export	Denotes the customs office by which export process is managed and controlled	Customs EU member state1, customs EU member state2, customs EU member state3
Customs office of exit	Denotes the customs office by which goods are intended to leave customs territory of the EU Conducts physical inspections of shipments and goods clearance	Customs EU member state1, customs EU member state2, customs EU member state3, customs EU member state 4
Customs office of import	Is responsible for the customs office in the country of destination (where goods are exported to) through which the consignment of goods enters the country	Non-EU customs1, Non-EU customs2
Customs inbound office	Denotes the customs office by which goods are intended to enter the customs territory of the destination country	Non-EU customs1, Non-EU customs2
Tax authority	Manages and controls tax formalities	Customs EU member state1, customs EU member state2, customs EU member state3,
Declarant	Issues export declaration in order to export goods	EU Food manufacturer, EU Beverage manufacturer, EU Paper and mill processor
Consignor or exporter	Denotes the party of ownership Consigns the goods to be exported Corresponds with the declarant role in some cases	EU Food manufacturer, EU Beverage manufacturer, EU Paper and mill processor
Consignee or customer	Receives the consignment of the goods Act on behalf of the customer in some cases	Non-EU customer1, Non-EU customer2, Non-EU Retailer1
Logistics service provider (LSP)	Organizes goods transport Provides transport services	LSP1, LSP2, LSP3
Carrier	(1) Physically transports the goods and are assigned by the LSP, (2) Provide container relevant original documents to relevant stakeholders	(1) Carrier1 , Carrier2, (2) Carrier3
Chamber of commerce	Is a voluntary organization of business firms, public officials and professional people; Provides certificate of origin for the consignment of goods	EU CoC1
Veterinary specialist	Is responsible for inspecting animal products (such as milk products) to assure regulatory compliance in export; Acts on behalf of national veterinary and food administrations	Veterinary Specialist non-EU state1
Quality specialist	Confirms that product ingredients meet quality measures of importing country	Individual acts on behalf of import office
Certificate agent	Issues certificates for health, origin, and veterinary certificate	Certification agency1, EU member state1

Foreign embassy	Is assigned based on country of destination and requests certificate of origin (in selected cases)	Foreign embassy1, Foreign embassy2
Port facility	Provides and manages transportation relevant infrastructure and documentation	EU member state1 facility1, EU member state5 facility1, EU member state2 facility1
Food administration	Represents national administrative authority for food matters	EU member state1 food administration, EU member state3 food administration
National statistics	Collects, analyses, and reports trade relevant statistics	EU member state2 bureau of statistics, EU member state1 bureau of statistics, EU member state3
Inspection agency	Involves Institute for Infectious Disease Control, Food inspection agencies and subsidy management	EU member state 3 inspection control, EU member state1 inspection control
EU regulatory authority	Manages and regulates movements of goods	EU legislature
National regulatory authority	Manage and regulate import and export of goods according to national laws and directives	EU member state1 ministry of trade, EU member state1 ministry of finance, EU member state2 ministry of trade, EU member state2 ministry of finance
Non-governmental organizations	Issues customs and trade relevant recommendations, guidelines, and standards	WCO, WTO, UN/CEFACT

The following paragraph concludes the observation from this section. Each of the observed networks contains a mixture of business and governmental actors. Each of the actors pursues a dedicated set of activities and tasks that are being assessed along the case study. At this stage, conflicts in roles have not been identified. Each of the actors is aware of the procedural tasks. Actors participate in the described collaborations from distinct countries within and outside the European Union. The directives set in place by the EU legislation trigger the export event, and expand internationally by involving foreign organizations. Concerning this observation, the networks do not differ. They differ however in the number of actors involved. So far, network a) has more actors involved, namely a veterinary specialist, a foreign embassy, and a chamber of commerce. Besides governmental and business actors, non-governmental organizations have been identified as those that issue recommendations in the context of trade and in particular customs.

3.4.3 Planned and Observed Status of MASP Implementations

Observed real-life settings are affected by the governmental plans of the EU because of the exports that originate in EU member states. The following elaboration on the status of MASP implemented results from documents provided by governmental as well as non-governmental actors and participants' feedback.

The prospected deployment of MASP divides into the following project stages (Table 3.6). Each of the stages is covered in (European Commission (2006d)), unless outlined differently, and introduced in the following. Stage 1, from 2006 towards 2009, relates to previously deployed applications, notably the New Computerised Transit System (NCTS) and the work in the field of risk management. Several systems will be added for Import (ICS), Export (ECS), applying the International Road Transport Convention for Transit (NCTS-TIR), and including the Economic Operators' Registration and Identification System. Stage 2, to be completed by 2011, deploys functionality addressing specifically traders' concerns: the EU Customs Information Portal and the Single Electronic Access Point (SEAP) (TAXUD (2006)). It refers to the completion of a fully automated export and import system including the Integrated Tariff Environment. One dependency of the launch of the Modernized Customs Code is the availability of fully described business processes. Stage 4 is related to the Single Window. The deployment of the above outlined implementation plan from stage 1 to 4 is dependent on country specific IS implementation projects (cf. European Commission (2006d), p. 19).

Table 3.6: MASP milestones

Source: cf. European Commission (2006d), p. 7.

MASP stages	MASP-relevant applications	Implementation timeframe
Stage 1	New Computerized Transit System (NCTS)	1997-2006
	Excise Movement and Control System (EMCS)	2006-2011
	Automated Export System (AES)	2003-2009
	Automated Import System (AIS)	2004-2009
	Risk Management Framework (RMF)	2004-2009
	Registration systems for Traders, Authorized Economic Operator (AEO)	2005-2009
	Common Customs Information Portals (CCIP)	2005-2009
Stage 2	Single Electronic Access Point (SEAP)	2005-2011
Stage 3	Integrated Tariff Environment (ITE)	2005-2011
Stage 4	Single Window - One Stop Shop (SW)	2005-2012

The status of MASP implementations in observed trade networks (see **Table 3.4**) is the following. The overview exemplifies the status and scope of implementations based on the examples of Excise Goods Movement and Export Control (EMCS) and Automated Export Systems (AES) applications.

Concerning EMCS the regulatory and implementation specific context is the following (European Commission (2003a)). The European Parliament and the Council of the EU adopted the Decision to computerise the system under which excise duty goods move between authorized traders in the Community under duty-suspension. Excise goods movement control and management address all excise product categories such as alcohol and alcoholic beverages, tobacco products, mineral oils and energy. Therefore, trade participants need to connect to the system. The full modification of the above outlined Regulation (EEC) 2719/92 is necessary to accommodate the exchange of electronic messages between all those involved in the system. These are the Commission, national administrations of the Member States, and economic operators. In addition, Directive 92/12/EEC (European Commission (2003b)) requires modifications to accommodate data exchange. The reasons are the following. The decision, based on a proposal put forward by the Commission in 2001 introduces a system that provides Member States with real-time information about consignments in transit, enabling them to plan checks and inspections in advance. Regulatory bodies expect the system to digitalize goods movements under duty-suspension and to monitor security measures and arrival at the declared destination. The Excise System Specification should fulfill both functional and technical requirements. The deployment of the EMCS has not met the original plan to go live by June 2009 in the Member States. The EU has now defined the deadline of April 2010 as of when the electronic exchange of EMCS-specific transactions among any Member State is required. For example in the UK, a staged approach is set in place with productive EMCS systems in April 2010, November 2010, and December 2011. In Austria, the deployment of the EMCS on national level is scheduled for October 2009.

Research observations discovered that the benefit of the EMCS approach is not clear to business actors such as manufacturers and declarants (cf. Rukanova et al. (2006)). The prospected benefits of EMCS are reduced processing time through digitalized forms and electronic information capture. Digitalized data streamlines reporting and should allow governmental actors to act faster in case of irregularities. However, efforts related to development and operational costs occur for each of the actors that need to implement EMCS. Compared to processing savings, maintenance and running of the system are additional investments actors have to cope with. Standardization for example to

assimilate and integrate the EMCS-relevant Local Reference Number with actor-dependent numbering systems is not included in the EMCS proposal. In addition, EMCS covers a register of to-be-exchanged excise data, so called SEED (ibid., p. 27). Each Member State maintains the register and actors involved in excise duty need to connect to SEED and upload relevant data. To-date SEED identifiers do not integrate to IS applications and do not follow a standardized schema. Further elements such as name, address, and license number differ. Actors prospect conflicts when exchanging data from distinct locations and applying different address formats. Operational activities within EMCS require transaction-based monitoring; compared to that the VAT reporting works with consolidated time stamps and issues reports per period. Integration to customs specific applications is not standardized or pre-modeled. Single Window, one of the further components of MASP applications, facilitates data access and exchange once implemented. To date EMCS and SEED do not integrate Single Window relevant requirements and rather dissociate from them. Actors perceive multiple data entry, error-prone data exchange due to differing data sets and formats, and higher efforts in data checks and manual corrections. Business actors predict that a standardized generic dataset resolves the issue of multiple data sets and error-prone re-entry of data. If implemented in a uniform format, a generic dataset embraces data elements and form-specific content in one electronic and unambiguous version. It then applied semantic data modeling and corresponds ideally to the needs of legislation. However, an agreement across the network and by regulatory sources is one of the prerequisites. The generic dataset works in any case only if the participating actors adopt the dataset and adapt their internal information systems to process the dataset within their organizations. The use of a generic dataset is limited if the accompanying legislation does not support its use. Furthermore, in case legislation leaves the specification up to the individual actors the process of finding an agreement and reaching consensus will consume time and efforts or even remain unresolved.

Concerning AES the regulatory and implementation specific context embraces the following. An implementation project for AES (henceforth e-Export) in one of the observed EU Member States serves as exemplified project. It started in 2006. The objective of e-Export grounds in the reduction of paper-based export declarations and the introduction of electronically processed forms and transactions relevant for export initialization and finalization. Tax and customs authorities focused on both managerial and technological perspectives in the setup of e-Export. Compared to the first stage of IS application design that enabled intra-organizational processing in 1988, the e-Export project aimed at facilitating the usability of e-Export for business actors. E-Export focused on direct data entry, export relevant reporting extraction, and marketing

strategies to invite organizations to apply the system more systematically. To increase system adoption the e-Export team integrated functionality of Single Window in the project scope and collected user requirements complementing regulatory requirements as outlined in the Modernized Customs Code. Observed processes include import, control, auditing, inspection, recipe control, and license relevant business operations. Unlike MASP that separates operations in multiple IS application concepts, e-Export in the underlying example aims to integrate named operations from a national perspective. The implementation resulted in a high adoption rate: Danish actors use e-Export in 95% of the transactions, 5% remains paper-based (cf. Bjørn-Andersen, N., Razmerita, & Henriksen (2007), p. 9). Adoption is high as other national and alike implementation adoption ratios show (cf. Bjørn-Andersen & Andersen (2003), p. 12). The high adoption ratio demonstrated the importance of collecting requirements from distinct actor roles and designing a multi-purpose application (Bjørn-Andersen, Flügge, van Ipenburg, Klein, & Tan (2007)). Process and transaction details disclose not yet resolved process breaks, manual and paper related process steps that cause additional workload for actors involved in process steps ‘export declaration’, ‘exit of goods’, ‘finalization of export declaration and import initiation’, and ‘import of goods’ (Table 3.5). Extra work relates to multiple data entry, manual data checks, verification of entered data against data repositories, as well as manual handover of common data sets to multiple actors in the network.

MASP relevant implementation projects such as EMCS and AES work independently from each other. Project plans are poorly choreographed and do not include dedicated intersections and integration concepts. So far, implementation projects proceed stand-alone and focus on an application-specific functionality and not the overall MASP objectives. To facilitate integrated supply chains, integrated transaction-based processing requires further IS-based elements. Besides an integrated business blueprint that covers all MASP relevant activities and functions, a MASP relevant overarching data model that forms the basis for IS engineering is missing. Business actors tend to postpone MASP relevant activities and implementations and form a position to improve current legislation and negotiate industry-specific exceptions, as demonstrated in the beverage trade network. Governmental actors involved referred to MASP as administering “fragmented systems“.

The following paragraph concludes the observation from this section. Each of the observed networks is affected by the plans of the EU administration and the MASP deployment. The MASP deployment is a project on its own and contains a number of stages and affects a series of existing or prospective IS applications. Any actor that is

directly attached to transit, export, or import products or provide services to these processes is affected by the MASP application. The insights into the excise goods movement and export systems details not only the current status of IS implementations, but also the concerns and issues that are being raised through the ambitious MASP planning. The reasons for the concern are diverse and not steered by one particular cause so far: an unchoreographed IS planning and a missing integrated IS blueprint that schedules in a reasonable order and sense the design, development, and deployment of the MASP applications. Despite the fact that the MASP is legally forcing the actors to implement or apply these applications, actors need to understand the benefits and the value proposition of what needs to be implemented and when.

3.4.4 Procedural and Regulatory Aspects

Procedural aspects of trade are concerned with inter-organizational activities such as the following. The case study investigated the business-to-government interactions based on a combination of exporting (EU member states) and importing countries (non-EU states). Export-import combinations are as follows: exporting countries that were subject to the case study are Denmark, the Netherlands, and Sweden. The analysis of the export from Denmark covered the importing countries Russia, the Dominican Republic, and China. The export from the Netherlands covered the import to USA, and the customs activites between Finland and Russia covered the export from Finland to Russia but also included aspects of the import from Russia to Finland (Figure 3.7).

Imported in → / Export from ↑	Russia	U.S.A.	Dominican Republic	China
Denmark	A-K		A-K	A-K
The Netherlands		A-K		
Finland	A-K			

Figure 3.7: Scope of export-from and import-to scenarios

Based on the analysis of actors, activities, and tasks for any of the above illustrated export-import combinations, a reference process is now being introduced that illustrates the export lifecycle from one EU country to a non-EU country (Figure 3.8). The analysis revealed process steps and sub-process steps that reflect commonalities among the three cases. Then, the process steps and sub-process steps resulted in the composition of a reference process. Process steps are indicated in Figure 3.8 by capital

letters A to K and sub-process steps are indicated in Figure 3.8 by process elements that are placed underneath each of the process steps.

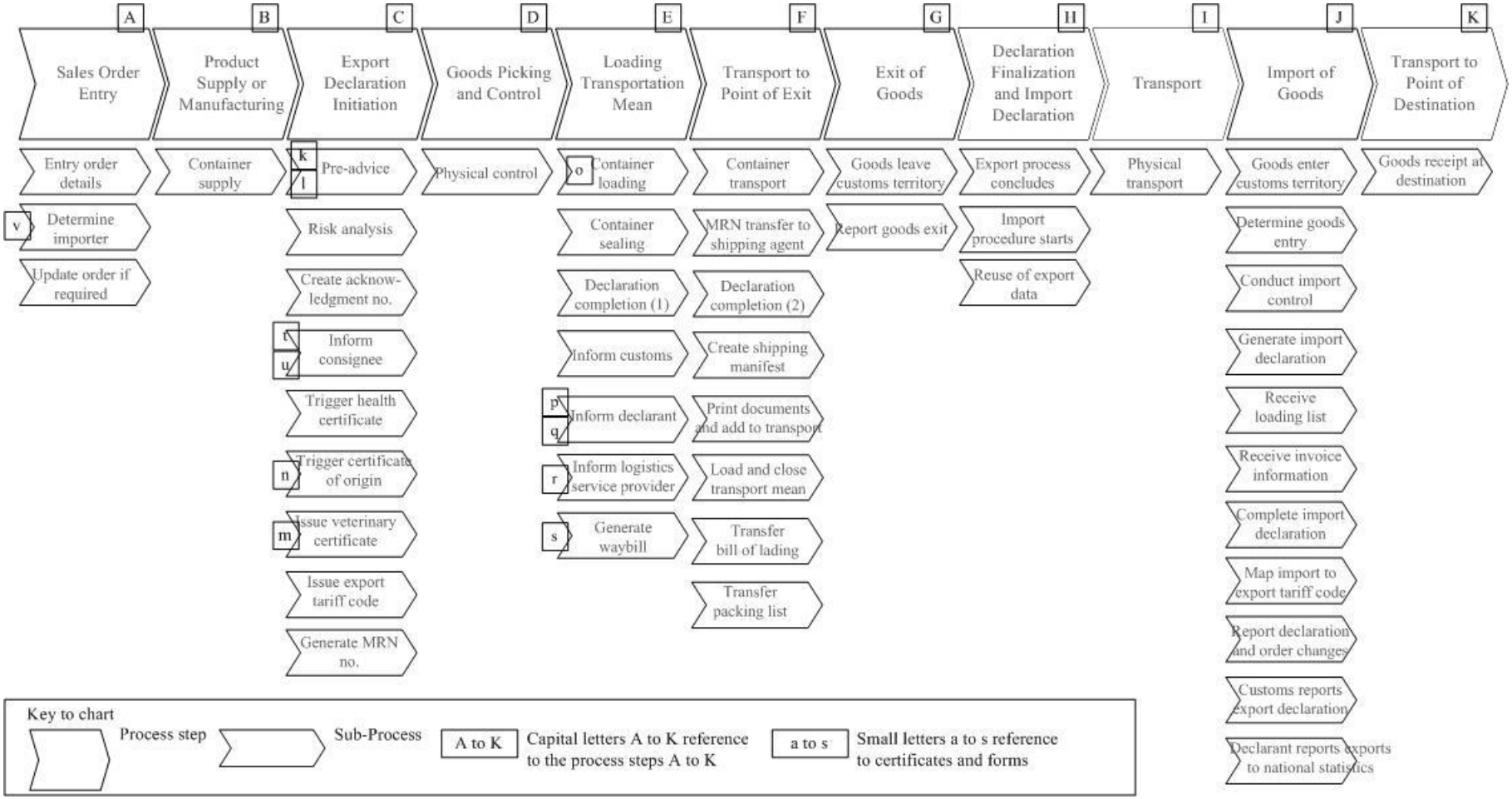


Figure 3.8: Reference process for customs activities in export

The reference process covers 11 process steps (A-K). Each of the process steps is subdivided into one to 11 sub-processes counting the sub-process elements underneath the process steps. The breakdown of sub-processes is result of the analysis of export processes in the observed real-life settings for the export-import combinations as introduced in Figure 3.7. The reference process as depicted in Figure 3.8 synthesizes core functions that have been analyzed in the observed export scenarios. Exporting countries under investigation were the Netherlands, Denmark, and Sweden with an emphasis on the Netherlands and Denmark. Importing countries included the Dominican Republic, China, the U.S.A., and Russia. Any of the sub-processes as outlined in Figure 3.8 refer to collaboratively conducted activities that are to regulate, govern, trade, and inform. Either one or many actors are involved that cooperate with other actors. These actors are business and governmental organizations.

The observed export-import combinations are subject to the reference process (Figure 3.9). Hence, each of the networks apply the above outlined process steps A to K.

Imported in / Export from ↑	Russia	U.S.A.	Dominican Republic	China
Denmark	A-K		A-K	A-K
The Netherlands		A-K		
Finland	A-K			

Figure 3.9: Scope of export-from and import-to scenarios

Further analysis of the details of the export-import combinations focuses on product-category relevant dependencies. Table 3.7 gives an overview of the differences in certificate handling and message-like notifications concerning commodity tariffs, weight, ingredients, recipes, and others. Two product categories are applied in the Table 3.7: dairy (or milk) products such as butter and cheese and excise goods that impose excise duties (example are coffee, beer, and cigarettes). With respect to certificates, they were mainly discussed in the case study as multiple stakeholders are involved in the handling of certificates, documents, and forms. The following documents were identified in the above-illustrated export-import process as a publicly shared element (Table 3.7). As applied in the reference process in Figure 3.8, Table 3.7 uses the alphabetical numbering in lower case to denote documents. The letters placed next to the process steps in Table 3.7 indicate the point of creation of documents as used in Figure 3.8, too.

Table 3.7: List of documents that were used in the case study

Documents (certificates, forms, and messages)		**Documents that depend on a product-category**		**Documents that depend on other variables**	
Document name	Document description	Category excise goods	Category dairy / milk products	Dependency on importing country	Dependency on security measures
Pre-Advice / Export Accompanying Document (EAD) [k]	Printed at declarant's premises after goods are released for export procedure. It accompanies the goods to the customs office of exit. The EAD is (regarding its structure and content, i.e. data) similar to the Single Administrative Document (SAD) and contains the Movement Reference Number (MRN) which is the most important reference to the goods and stated by a unique number as well as a barcode. The EAD is the central document of the export process and contains most of the data that are used for other documents and certificates.	applicable	applicable		
AIN message [l]	AIN stands for 'aangifte informatie' and means declaration information.The AIN message is a digitalized exporting and importing message used in the NL.	applicable	applicable		
Veterinary Certificate [m]	The veterinary certificate is required for export and import of dairy and milk products to Russia and, therefore, needs to be added to the export declaration. It has to be signed by an authorised veterinarian on behalf of the Danish Veterinary and Food Administration.	not applicable	applicable	Russia	
Certificate of Origin [n]	The Certificate of Origin insures authenticity of the exported products and is issued for each product by the Danish Chamber of Commerce.	applicable	applicable		
CMR document [o]	The CMR is a transport document/message which evidences a contract between a carrier and a sender for the carriage of goods by road (generic term). It is handed over from the declarant to the carrier at the place of loading.	applicable	applicable		
Accompanying Administrative Document for Export (AAD-Export) [p]	The AAD-Export is used while transporting excise liable goods. It gives evidence to the declarant that the goods were exported. Document is provided by customs office of export.	applicable	not applicable		
Ex A document [q]	The Ex A document is a similar to AAD-Export document but used for non-excise liable goods. A combined shipment is possible in case both documents are printed.	not applicable	applicable		
Bill of lading [r]	Contractual document giving details relating to the shipment of a consignment of goods. It shows the names of the consignor and consignee, the point of origin of the consignment, its destination, route, and method of shipment, and the amount charged for carriage.	applicable	applicable		
Waybill [s]	Transport document issued by a carrier giving details and instructions relating to the shipment of a consignment of goods. It shows the names of the consignor and consignee, the point of	applicable	applicable		

	origin of the consignment, its destination, route, and method of shipment, and the amount charged for carriage. Unlike a bill of lading, a waybill is not a contractual document.				
Quality Certificate [t]	The Quality Certificate is a needed for all goods being exported and imported to Russia. It is issued in Russian and can be provided by the declarant directly. The document certifies product characteristics, such as percentage of water and fat in the product.	applicable	applicable	Russia	
GOST Certificate [u]	The GOST R Declaration of Conformity is the official document with which a manufacturer assures that his products meet Russian safety regulation and as such a prerequisite for product placement onto the Russian market. GOST is a mark of conformity, declares that products bound for Russia are tested and certified in accordance with Russian standards of conformity. It is issued in Russian by a dedicated agent called SGS / Switzerland.	applicable	applicable	Russia	applicable
C-TPAT [v]	Importers are required to obtain the C-TPAT (Customs-Trade Partnership Against Terrorism) certificate prior to importing to the U.S.A.	applicable	applicable	U.S.A.	applicable

Concerning the question which actor is performing which process activity in the collaboration, Table 3.8 illustrates the mapping of actor roles to process steps. For the ease of referencing, the table indicates for each of the actor roles their participation in the process steps of the reference process by adding the letters that symbolize the process steps to the actor roles.

Table 3.8: Cross-reference of observed actors to process steps

Actor roles	Reference letters to process steps
Customs office of export	C, G
Customs office of exit	C, G
Customs office of import	H, J
Customs inbound office	H, J
Tax authority	G, H
Declarant	A, B, C, E
Consignor or exporter	A, B, C, E
Consignee or customer	J, K
Logistics service provider (LSP)	D, E, F
Carrier	D, E, F, I, J, K
Chamber of commerce	C
Veterinary specialist	C, J
Quality specialist	C, J
Certificate agent	C, J
Foreign embassy	C, J
Port facility	E, F, J
Food administration	C
National statistics	H, J
Further instances	C
EU regulatory authority	C, H
National regulatory authority	C, H, J

In addition to the share of tasks in the export process, the study revealed that actor roles collaborate to create, issue, and receive publicly shared documents. Examples are outlined in Table 3.9 based on a differentiation of dairy products and excise goods.

Table 3.9: Observed documents and relevance to product types

Documents	Actor roles involved in dairy product export	Actor roles involved in export of excise goods
Certificate of origin [n]	Declarant, Consignor, Consignee, Foreign embassy1, Chamber of commerce1	Declarant, Consignor, Consignee, Foreign embassy1, Chamber of commerce1
Veterinary certificate [m]	Declarant, Customs, Veterinary Specialist non-EU state1	Not applicable
Quality certificate [t]	Declarant	Declarant
GOST certificate [u]	Declarant, Consignee, Service provider, Non-EU customs1	Declarant, Consignee, Service provider, Non-EUcustoms1
C-TPAT [v]	Declarant, Non-EU customs2, LSP1, Carrier3	Declarant, Non-EU customs2, LSP1, Carrier3

Concerning procedural aspects, security- and control-imposed activities are an essential part in excise-goods trade. Security refers to secure trade from production to delivery. In principle, selling of excise goods from one country to another involves the payment of excise duty. Tax and customs regulations point to control-imposed measures for excise goods. The following sources are relevant to assess control-imposed measures (Table 3.10).

Table 3.10: Regulations and recommendations related to process control

Sources	Relevance
DG Taxud Decision No. 1152/2003/EC (European Commission (2003b), p. L9/13)	"For that purpose, it is appropriate to use the computerized system established by Decision No 1152/2003/EC of the European Parliament and of the Council of 16 June 2003 on computerising the movement and surveillance of excisable products ".
DG Taxud (DG TAXUD (2006a))	Control measures should cover compliance and performance measurements.
DG Taxud (DG TAXUD (2006b), p. 7)	Control measures embrace multiple stakeholders such as traders' activities. They include "rules, structures, operating methods, reputation and financial standing".
DG Taxud (DG TAXUD (2006b), p. 13)	Control can be processed manually through a form containing explanatory notes and control results.
DG Taxud (cf. DG TAXUD (2006a), p. 14)	The Danish customs control office subsumes physical control and IT-enabled risk relevant audits.

Responsibilities for excise duty vary. In some countries, tax authorities are in charge of excise duty control, in others, customs authorities. Non-governmental organizations such as WCO present detailed control-based measures. The Revised Kyoto Convention issued by WCO points to control principles based on physical and risk relevant control methods (cf. WCO (2000), p. 10). From a procedural point of view, control diminishes error-prone data entry and labor-intensive data verification. Accessible information

along the export-import-process allows actors to implement simplified customs clearance. Physical movement controls embrace documentary and physical examination, the identification of goods, and escorting goods. Audit-based measures include post-clearance audits. WCO recommends a system (IT)-based audit that discloses business and financial transactions, payment and account details as well as goods relevant information such as production and distribution costs. Thus, excise control takes place at multiple checkpoints along the reference process from A to K and involves distinct governmental organizations. The involvement is as follows. In case excise goods move from an excise to another excise warehouse excise duties do not occur. As soon as non-excise locations are involved, excise duties apply. The import declaration is proof of liability (document p). Excise relevant movements require regular reporting to the local governmental authority at the point of export (process step G) and import (process step I). The declarant is not liable to excise payment and attests goods sales, quantities, and value to the local authority. The importer however is liable. Controlled liability attests at the point of import through the handover of bill of lading (document r) and invoice to the importing customs agent. Applying the concept of public and private viewpoints in the above-outlined example, the audit-based procedure that is publicly shared among four actors looks like the following (Figure 3.10). The figure outlines a set of business objects that construct the audit-based procedure. In case of the four actors, the declarant (actor A), the export customs (actor B), the import customs (actor C), and the carrier (actor D), all four participate in the procedure. Internal, private processes they conduct are outlined by the individual process flows.

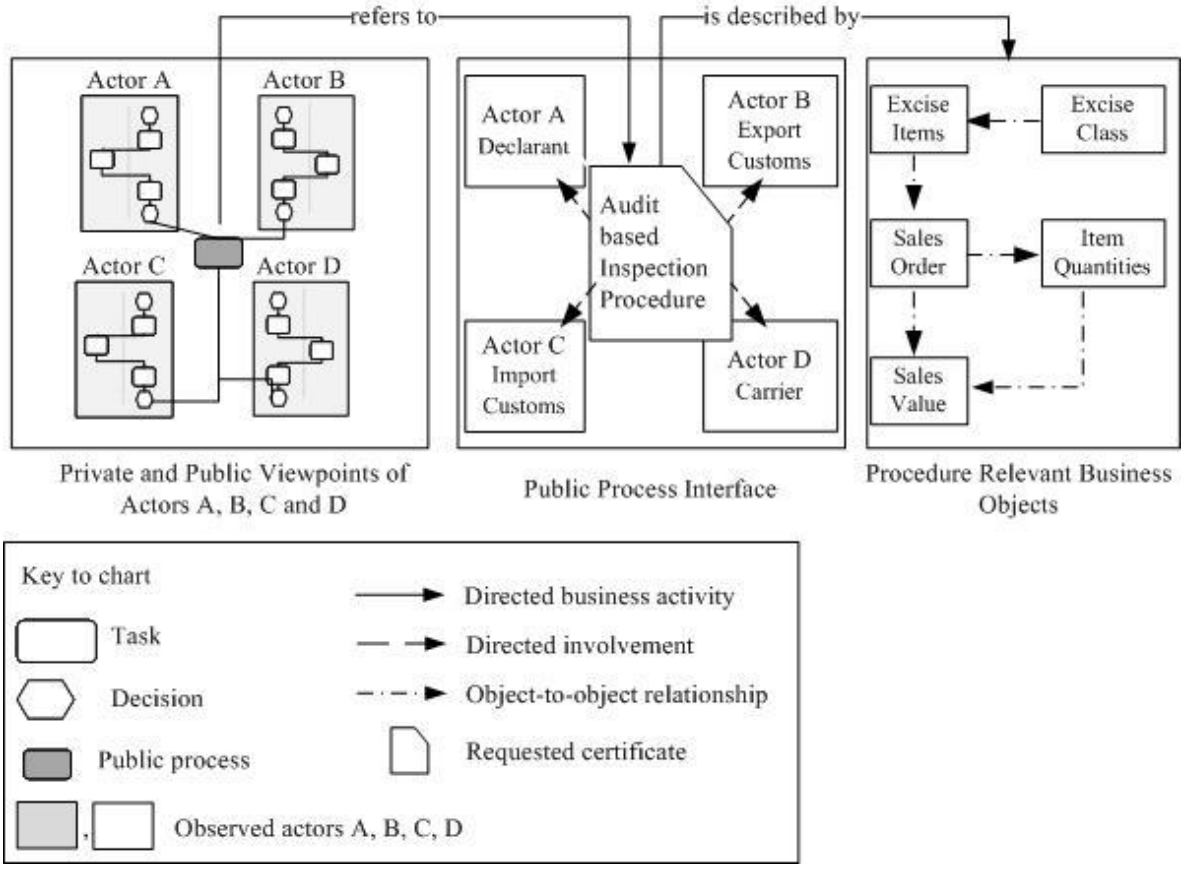


Figure 3.10: Public view on excise goods movements

The study reveals the need of a governance model where business and governmental partners seek to share control in export. The core principle of the model asks business partners to prove that they control their own operations related to goods and information in co-operation with other organizations. Governmental actors counter-control the results and certify compliant actors. Exemplified in the Green-Lane concept at the EU (Finnish)-Russian border (cf. Ollila (2007), p. 6), certification examples are the U.S. American C-TPAT certificate (cf. U.S. Department of Homeland Security (2001)), the AEO certificate supported by the WCO (cf. WCO (2007b), p. 9) and the EU (European Commission (2007b)). All three examples share the concept of a public (process) interface that makes information about goods, trade lanes, and collaborating actors transparent. Table 3.11 describes the named certificates in detail.

Table 3.11: Publicly processed certificates

Certificate	Business and Governmental actors that participate in the certification program	Core principle
Green Lane	Carriers, Finnish and Russian customs	Russian customs receives electronic information of exports from Finland to Russia. Export covers non-excise goods.
C-TPAT	U.S. Customs and Border Protection and actors that import to the U.S.A. such as carriers, consolidators, importers, and port operators	Importing party applies for certificate and agrees to pre-provide organizational and procedural details as for example IT controls or cargo access controls.
AEO security certified actor	Any of the actors that participate in a cross-border supply chain, as for example manufacturer, exporter, forwarder, warehouse keeper, customs agent, carrier, or importer.	Applicants reveal financial and organizational data to outline structural details including supply chain partners. Actors transmit information that details how they safeguard goods in their premises and ownership.
AEO certified supply chain	Cross-border supply chain itself comprised of AEO certified actors.	Entire supply chain shares and publishes information and routines, including AEO certificate number and detail.

The following paragraph concludes the observation from this section. Based on the analysis of actors and the regulatory baseline of the observed networks, this section introduced the core business process of an export from one actor in one country to another actor in a different country. The section undertook the exercise to decompose the observed processes in the case study and compose them into a reference business process that contains process elements and adherent process steps. The composition of the process steps is expanded by regulatory requirements that are apparent in form of documents and official forms or certificates. The illustration of the process and its details is found useful to illustrate the end-to-end process of export. It reveals the complexity of such a process. The assessment of the regulatory requirements disclosed the actors that are expected to participate or perform legally enforced certificates or documents. That level of analysis at the document level confirms the differences in the networks based on the industry-specific and product-relevant details. In the case of network a), the additional actors are addressed in the regulatory requirements of the veterinary certificate. Furthermore, the composition of the reference process discovered the need of security- and control-imposed measures that are demanded by legislation. Governmental actors in personae customs and homeland security offices seek a higher control of the process and its involved actors. Thus, certificates do not only concern products but actors. They are being introduced on a worldwide basis (AEO certificate as being referenced by the WCO), on a European basis (AEO certificate as being referenced by the EU government and local governments), and based on trade agreements (Green corridor permission as being issued by Russia and the EU).

3.4.5 Prospected Effects of Standards on Trade Networks

To face globalization challenges, the adaptation of the European customs programme was required. Herein, the demand for change addresses among other needs two focal needs (cf. European Commission (2006b), p. 9-14). Firstly, the demand concerns the revision of EU-centered legal, political, and IT related aspects. Secondly, it confirms the importance of putting European customs matters in a global customs perspective and hereby helping to streamline European customs activities. Now, governmental and non-governmental actors choose different adaptation approaches. Non-governmental actors such as WCO use IT-enabled audits to efficiently analyze, track, improve, and apply regulations. In WCO and the Revised Kyoto Convention in particular standards are seen as beneficial in case "trading partners operate the same standards [and] […] software costs will be considerably reduced"(WCO (2006a), p. 60). Still, WCO refers to traditional concepts such as EDIFACT, fax, and e-mail (cf. WCO (2007b), p. 20). Governmental actors address standards similarly. They point to process integration and transaction based scenarios that are promoted in regulations such as the Modernized Customs Code. Standards are seen to ease daily operations and reflect directives from governmental institutions. A prominent example of legal adaptation is the Modernized Customs Code and the Multi-Annual Strategic Plan (MASP). Governmental actors engage through multiple roles in export-relevant customs management. They drive policies and regulations and execute legislative decisions. Governmental authorities are institutional counterparts to non-governmental organizations. The institutional role expands due to an increasing impact of regulations in customs operations. An example outlines the expansion in case of automated export systems (Table 3.12).

Table 3.12: Expectations in electronic customs

Source: European Commission (1992), p.15; Taxud (2004), p. 16.

Community Customs Code (European Commission (1992), p. 15)	Modernized Customs Code (cf. TAXUD (2004), p. 16)
The automated export system is meant to "provide full control of the conclusion of export operations through the electronic exchange of export and exit information between customs offices of export and customs offices of exit, in particular where different MS [Member States] are involved".	The role of IT is to ensure that operations started in one Member State can be finalized in another Member State. This includes the exchange of electronic messages related to the different stages of the operations amongst the various actors.

The example shows differences in the expectation setting between the former Community Customs Code (European Commission (1992)) and the Modernized Customs Code (TAXUD (2004)). Expectations in standard-enabled B2G evolve from various perspectives:

- The former Community Customs Code addressed governmental actors. The Modernized Customs Code points to any actors involved in export, as for example economic organizations such as economic operators, service providers, and further enterprises.

- The Modernized Customs Code seeks end-to-end monitoring in any global supply chain through accessible trade-relevant information across organizations and pre-defined operational checkpoints. IT applications steer accessibility and enable governmental institutions to maintain and share information more effectively.

The Modernized Customs Code is to-date the most actual outline of standardization-alike efforts in the field of customs modernization from a governmental institution. It influences administrative and operational procedures on EU, national, and non-EU level. The Modernized Customs Code embraces the EU Customs Information Portal, Single Electronic Access Points, Economic Operators' Registration and Identification System, Risk Management Framework and Registered Exporters (Table 3.13). Table 3.13 introduces IT-relevant aspects of the Modernized Customs Code in the left column. Compared to the needs of governmental and non-governmental actors, the study revealed benefits of e-enabled B2G. Regulatory source of the assessment is the Modernized Customs Revision 8 (European Commission (2007d)).

Table 3.13: Benefits from standardization interpreted from legislation

Source: cf. European Commission (2007a), p. 7-9

Modernized Customs Code	Prospected key benefits for governmental actors	Prospected key benefits for non-governmental actors
Automated Import System and Centralized Clearance	Fast reception and treatment of entry summary declarations More rational use of control resources and more effective procedures	Tracking information related to import declarations Connecting easier with customs authorities
New Computerized Transit System	Faster and more effective control and discharge of goods-in-transit transactions Efficient administration of transit declaration by re-using of already existing information Lower development costs related to homogeneous IT infrastructure	More efficient transit procedure Faster release of guarantees Multi-usage of declarations
Automated Export System	Full control of export and exit of goods from the Community territory Efficient handling and control of exiting movements Fast reception and treatment of pre-departure declarations Re-use and push functions of information to other national administrations and agencies	Early confirmation of accounting relevant operations such as VAT deductions and export refunds Flexibility in connecting with customs authorities Centralized and standardized procedures for export handling and clearance
Single Window	Efficient risk management Increased simplification and security of customs operations Easier cooperation with other government authorities	Single point of data entry and data access for customs and non-customs legislation for cross-border movements of goods Ability to request licenses and certificates from administrative and economic bodies
Authorized Economic Operator (AEO)	Reduce administrative and financial resources to verify actor's security compliance Faster and easier access to AEO related information throughout the European community Control and supervising tool to track operators' organizational and economic status on national and European level	Easier admittance to customs simplifications Entitled to benefit from facilitations concerning safety and security controls Fewer physical and document based customs controls

As illustrated above, benefits are perceived from two perspectives: the regulation provider's point of view and the regulation receivers' point of view. Despite the individual roles that are performed in customs management, regulation receivers expect a standardized, pre-defined concept for both procedures and electronic means. A closer look into regulation reveals greater detail from a standardization and IT-perspective. Herein, standardization is expected on a technical, a semantics, and an interaction level. As exemplified in Table 3.14, legislation refers to data elements and processes on the interaction level. Technical standardization is denoted in form of standardized login procedures and system interfaces that connect ERP-systems. On the semantics level, legislation refers to concepts such as single registration numbers that require an agreement upon the meaning and purpose of the number, the numbering system, and the necessary versioning of the registration numbers across all European member states.

Table 3.14: Examples of standardization requirements in legislation

Source: cf. European Commission (2007a), p. 7-9

Modernized Customs Code	Standardization potential	Assumed standardization level
EU Customs Information Portal	Standardize data elements related to customs operations and distribute them across actors	Interaction level
Single Electronic Access Points	Standardize system interface to log information and customs declarations	Technical level
	Harmonize business processes that are relevant across actors	Semantics and Interaction levels
Economic Operators' Registration and Identification System	Introduce and use single registration number used for all customs operations	Semantics level
	Provide connectivity between distinct ERP-systems	Technical level

The following paragraph concludes the observation from this section. The prospected potentials as identified above indicate the need for standardization. Elements such as registration numbers, customs specific actors including declarant, consignor, and consignee are stated as relevant. As exemplified above, there is some, but little indication of IS standards benefits to foster the implementation of the Modernized Customs Code. The role of IS standards is still uncovered: detailed information about exchange formats and common semantics are missing so far. Due to the nature of regulations related to information technology, "Article 133 Committee" (cf. European Commission (2009), p. 51-52) does not regulate nor influence the procurement and implementation of required information technology. The observation reveals that to-date regulations exclude recommendations for application and systems landscape design,

application types, or deployment of specifications in the field of customs. At this stage, the conflict between prospected and expected effects of the MASP directive seems apparent. Still, it needs to be studied if the conflict is apparent to the observed networks and if the conflict proves true. The next section attempts to respond to this question.

3.4.6 Applied Standards in the Studied Trade Networks

This section points to the results of the analysis of IS standards applied in the study and further standards assessed. Standards in this section refer to those used by actors involved in the study. They differentiate depending on the observed trade networks (Table 3.4) and point to the reference process (Figure 3.6). The result of the anlaysis is as follows. Table 3.15 combines both sources and outlines the IS standards-related characteristics for each of the observed network. Network characteristics concerning IS standards focus on standards that are used in the network, the scope of the applied standards, and the effects of the standard's use on the collaboration within the network.

Table 3.15: Observed standards and standards effects

	Networks		
Network characteristics	(a) Trade network Denmark-Russia	(b) Trade network NL-UK-USA	(c) Trade network FI-Russia
Standards used	EDI, EDIFACT	EDI, EDIFACT	EDI papiNet
Scope of standards used	Electronic messaging with Danish authorities, Otherwise paper-based exchange	Electronic messaging with Danish authorities, Otherwise paper-based exchange	Electronic messaging with Danish authorities, Paper-based exchange, papiNet use not observed, RosettaNet use is under investigation
Effects on collaboration	Fragmentary process and data flow among actors Paper-processing in use to fill-in standard limitations Small and medium-sized enterprises as observed in network c) prefer paper due to limited IT skills and infrastructure Industry standards not in use for B2G processes Data entry for customs declarations requires direct access to governmental applications or EDI messaging		

New to the list, the industry standard papiNet is an XML based message standard for buying, selling and distributing paper products. The scope of papiNet emerged from purchase order, delivery messages, debit and credit memos, vendor management inventory, and covering forecast and order request functions. PapiNet serves to-date

transaction processing for business actors such as customers and suppliers and not B2G collaborations. The trade network observed in the study uses the standard for B2B between manufacturer and its customers. The standard does not provide export or import related elements.

The following paragraphs illustrate the findings in the case of network a) (cf. Andersen, H., Flügge, Petersen, Rasmussen, & Tan (2007), p. 19). Despite the fact that the e-Export system is fully functioning, users state a number of issues related to its use. Three areas are apparent: the exchange of documents between actors as for example carrier drivers prior to EU exit, the amount of export-related paperwork at the port and other carrier stations, and the lack of electronic support of VAT reporting. Due to a high number of declarations to be processed, the e-Customs application slows down and delays declaration processing. The application does not cover procedural changes that result from regulatory changes. Multiple declarations issued by one declarant for example require multiple data records. Summary declarations in observed application are not facilitated. Consequently, the effort of processing individual declarations is higher than collecting them for example on a monthly or bi-monthly basis. Especially organizations that export regularly the same products are faced with frequent and redundant data entry and data checking efforts. Certificates and enclosed documents are not fully implemented nor by the business actor or the governmental authority. The lack of coherent usage of data elements such as country of origin, product classification, and trade actors' details hamper the re-use of elements in multiple forms. The usage of paper-based forms limits re-use of data and causes additional data check and data entry. Paper-based forms are the GOST certificate, the health certificate and the certificate of origin.

Key activities as observed in the network are as follows. Fourteen process steps retrieved from the analysis of interactions among actors (Table 3.16). Each of the process steps concerns a particular activity within the export process. Potential duplicates of activities that conclude in one process step and those process steps that needed further refinement have been discussed with the participating actors and clarified. The process steps as outlined in Table 3.16 do not claim completeness. However, they correspond to some of the process steps as depicted in the reference process (see **Figure 3.8**). The assembly of the 14 process steps demonstrates how to break down any business process that is subject to multiple actors. Focusing on the inter-organizational aspect, the process steps do not necessarily relate to intra-organizational activities of an individual actor. Still, the process steps give an indication

of internal activities an organization should become aware of to support the fulfillment of external process needs.

Table 3.16: Retrieved process steps in the reference framework

Process step number	Process step outline
1	Provide service
2	Set guidelines
3	Control
4	Confirm subsidy
5	Deliver
6	Control information
7	Pre-notify arrival
8	Provide shipment information
9	Provide certification
10	Pay subsidy
11	Prove entry
12	Denote tax changes
13	Test
14	Apply license

To illustrate the application of the process steps from Table 3.16, Figure 3.11 exemplifies the use of the process steps in one of the studied networks (network a). The process steps that connect actors as outlined in Figure 3.11 show a high interaction among the actors. A further analysis based on the unstructured outline is not feasible. The analysis concentrated on the connectedness of the actors based on procedural activities that are being conducted. It shows that one process step as for example process step 2 ‘set guidelines’ is conducted by more than two actors, the EU government, the national food administration and the national customs office. Similar connectedness takes place to provide services between banks, health authorities, the national customs office, the manufacturer, the service provider, and further actors.

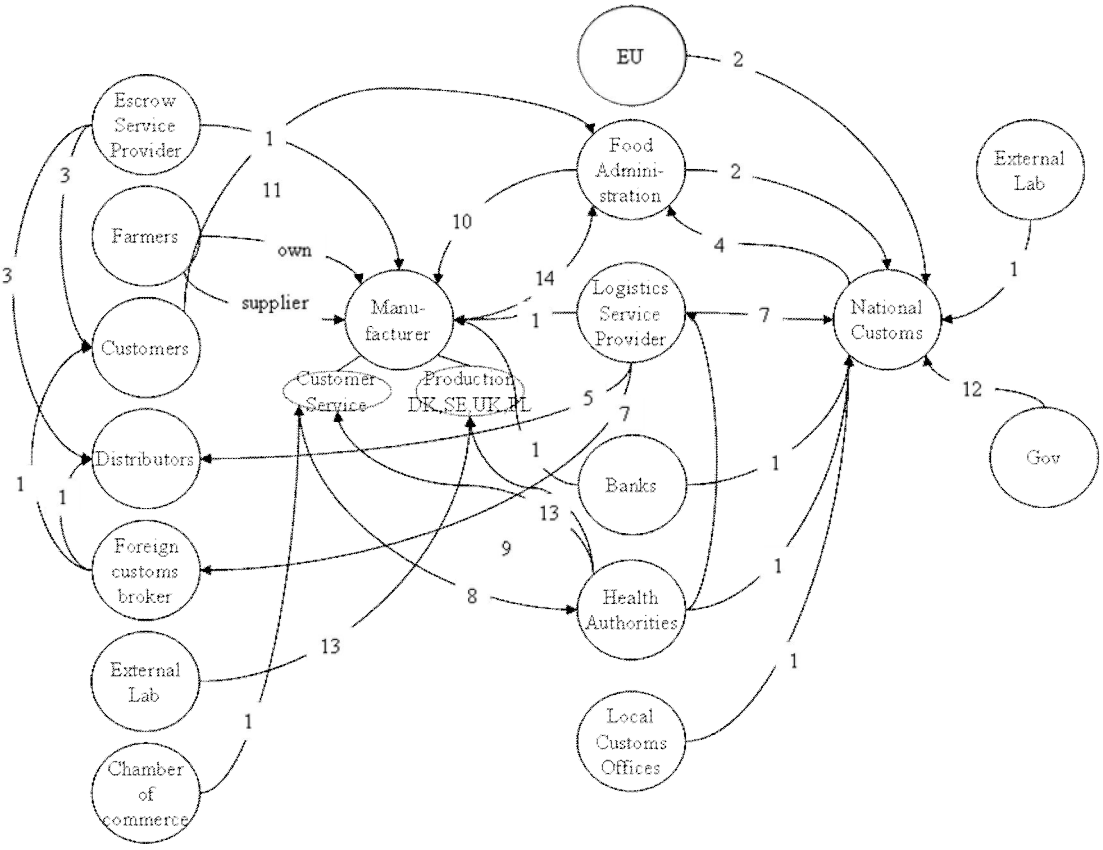


Figure 3.11: Process steps as observed in network a)

Impact on collaboration performance and number of release cycles multiplies with the number of actors involved. In case of network a) external labs, health, food and agricultural authorities, and veterinary specialists add to the number of actors. In addition, trade scenarios differ in case of delivering to customers, agents, or declarant-owned subsidiaries. By partly using paper-based forms and B2B standards for some pairs of actor-actor-relationships, the overall benefit of IT-enabled collaboration limps. Intra-organizational processing and operational activities in network a) base on a thought-through ERP-based application landscape. Processes and operations function on a multi-national scale from forecast, production planning and optimization, sales and distribution, to supplier integration and knowledge management.

A detailed analysis of an inter-organizational export process that was subject in the case of network a) is now introduced. The analysis revealed process breaks, a lack of electronic data exchange, and low-performing integration of business and governmental actors upon finalization and release of the export declaration (Figure 3.12). The actors in the outlined export example are the declarant, Danish customs, a logistics service

provider (LSP), and the carrier and shipping agent. Along each of the actors export-related customs activities are carried out.

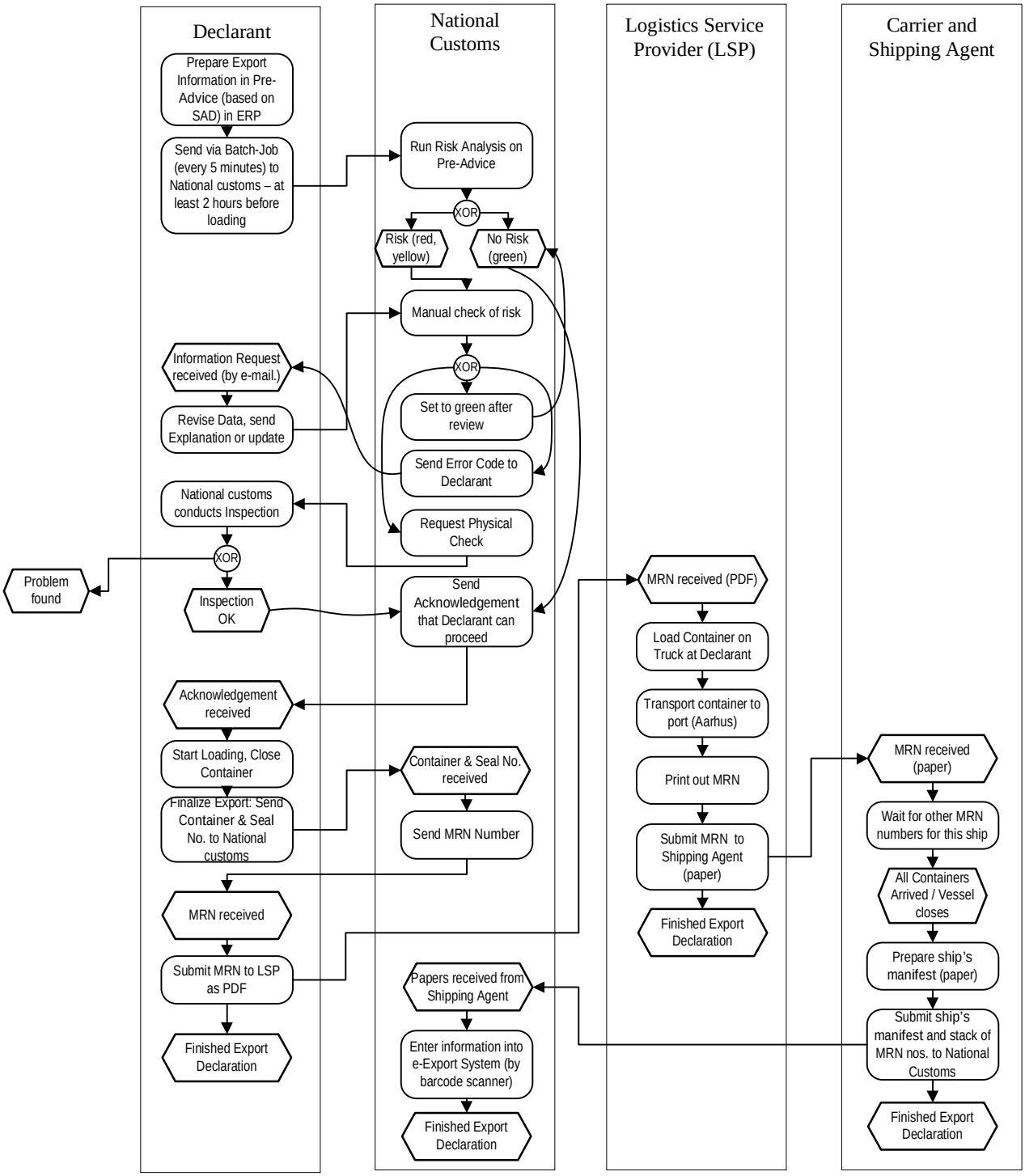


Figure 3.12: Export process activities in network a)

As illustrated in Figure 3.12, the following activities were stated most relevant to customs management in the observed network. To initiate the export and therefore to declare the export, the declarant prepares the pre-advice in the information including exporter name, VAT number, consignees, and a reference to the invoice. The information is submitted to customs as a EDIFACT message. Customs evaluation of the received information is now being prepared. It is required by law to run a risk analysis of the declared export. A batch job that runs every five minutes transfers the data to national customs. Danish customs conducts the electronically conducted risk analysis and checks the data. It checks data completeness, the declarant, the consignee, any export related incidents that occurred in the past concerning the declarant and consignee, and the product that should be exported. The risk analysis could either result in the (1) continuation of the export procedure without any detected risk from a customs perspective or in a (2) more detailed checking of the to be declared export.

In the case that (1) customs acknowledges the pre-advice and sends that response to the declarant, the declarant in cooperation with his LSP and the container provider starts loading the container or truck depending on the chosen transportation mean. Once the container is loaded, closed and sealed, container and seal numbers become transferred via the declarant's information system to national customs. In case the transportation is conducted by truck, the truck number is being transferred electronically to national customs including a seal number in case the truck is loaded with containers. In case the truck is containing the shipment and no containers, the truck number is being submitted. The loading concerning both transportation means takes place at the declarant's site. Based on the received seal and transportation mean numbers, national customs generates a movement reference number (MRN). National customs then returns the MRN back to the declarant. The declarant passes on the MRN to the LSP. From a declarant's point of view, the export declaration is officially finalized with the submission of the MRN to the LSP.

The LSP receives the MRN in form of a paper-printout that is being transmitted to him. From the declarant's point of view, the export declaration is now officially finalized. The LSP is loading the container on a truck either to ship the product via truck or to deliver the product via truck to the vessel at the declared port. In this case, the port is the port of Århus, Denmark. Once arrived at the port of Århus, the LSP prints the MRN number and hands it over to the carrier and shipping agent. From the LSP's point of view, the export declaration is officially finalized with the submission of the MRN to the carrier and shipping agent.

The carrier and shipping agent receives the printed MRN. The agent is now awaiting further deliveries of containers to start the loading of the vessel. As soon as all containers arrived, the loading continues. Once the loading is finished, the agent is able to collect all the MRN numbers for the determined vessel and to complete the ship's manifest. The manifest is a document that lists all container numbers and the ship name. The agent submits the manifest and all MRN printouts to national customs that are located at the port of Århus. From the agent's point of view, the export declaration is officially finalized with the submission of the manifest and the MRNs to customs. The vessel is ready to leave the EU.

National customs receives the manifest including the MRN papers for each of the individual export declarations. A customs officer scans the MRN numbers and enters the data into the e-Export system. Same applies to the ship's manifest. The export declaration process hereby concludes for national customs. The vessel officially left the port.

In the case that (2) the risk assessment requires further checking, the customs officer sends an error code to the declarant via the e-Export system. Herein, national customs assumes firstly that an error in the EDIFACT message or in the transmission from the declarant's information system to the customs' e-Export system occurred. Based upon the receipt of the error code, the declarant revises the data, prepares an explanation and resends the EDIFACT message that contains the pre-advice. Then the revised data will be transmitted back to customs. Based on the revision, the customs officer carries out a manual check of risk. The customs officer decides based on the risk assessment results if a physical check of the goods need to be conducted or if the declaration process could proceed. If useful, the declarant sends in parallel an e-mail to the national customs office. The customs officer checks now manually the export declarationm the transmitted data and the declared goods. He determines whether the pre-advice is now acceptable and the export is risk free.

The observations from the outlined export process are the following. Process breaks are apparent in the exchange of data and information between the four actors. The risk analysis at the stage of the rejected pre-advice is processed manually. Data needs to be checked manually as in case of the MRN number and the ship's manifest. Besides manual, paper-based and apparent process breaks, the process sample outlines the high interactivity level between governmental and business actors. Above-outlined lack of standards usage leads to process breaks and longer process duration because of paper-based activities (Figure 3.13). The described risk analysis was not checked further. National customs did not reveal in the case study the parameters that were applied to

check the risk of the declared export. More details might have led to an ease of data transmission and to verify the need of more transparency among business and governmental actors in the customs procedure. The assessment of networks b) and c) revealed process breaks and paper-based activities similar to network a) (Figures 3.14 and 3.15). A parallel study carried out in the Swiss export market confirms the lack of integrated processes and data in customs management (Boutellier, Flügge, & Raus (2007)), though the observed process shows a high interaction among the actors. Connectedness takes place among two or more actors from distinct organizational backgrounds and locations. The aim of the section was to give insight into standards' use in the studied process. Standards that have been observed in comparable studies refer to industry-specific standards such as PapiNet and cross-industry standards such as EDI. Still, manual activities are apparent. In fact, collaboration effects remain undetected in case of manual paper forwarding: in the depicted networks, the consignee and the export customs officer do not interact in the paper-based export process. If a standardized service or enabled document transfer was available, it would lead to a direct electronic data exchange between both actors. Then, both actors benefit from a simplified and faster publication of data. This could then be beneficial to the actors to streamline their internal operations and to exchange relevant data that remained invisible until the paper document leaves customs and arrives at the consignee.

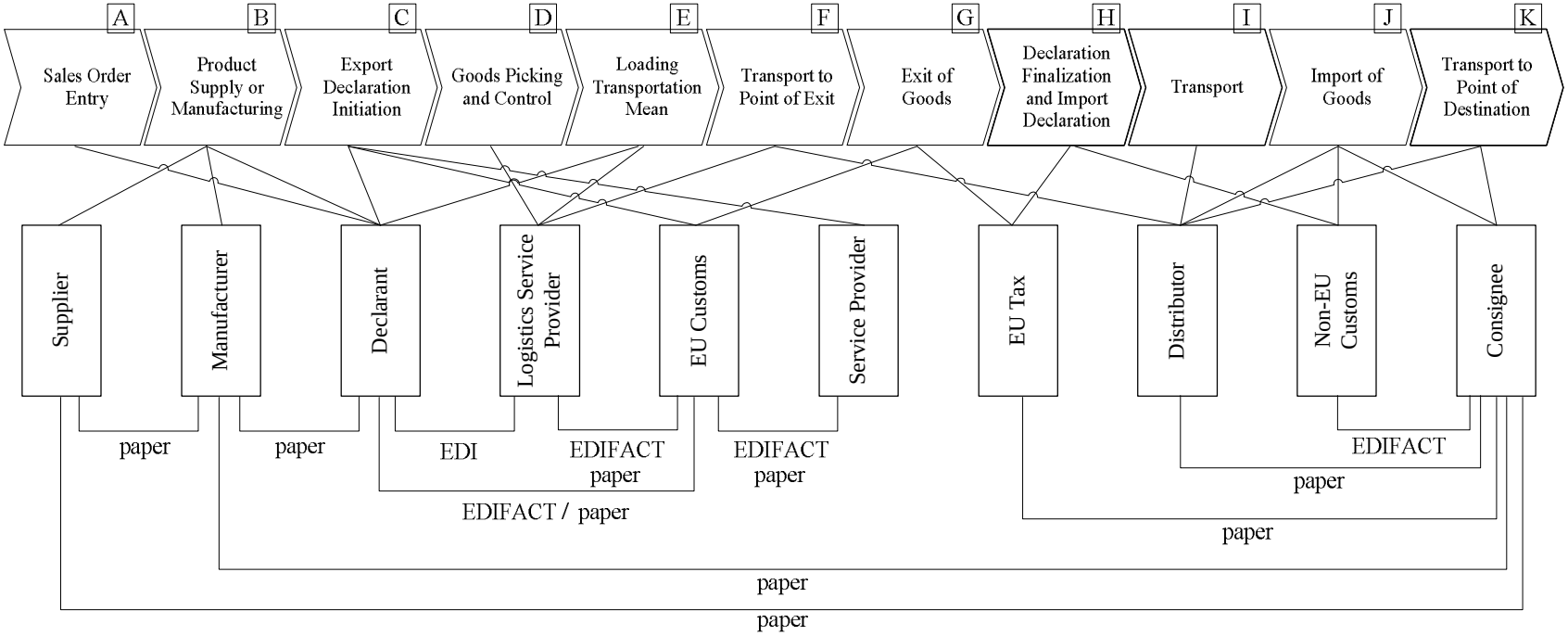


Figure 3.13: Standards usage experienced in network a)

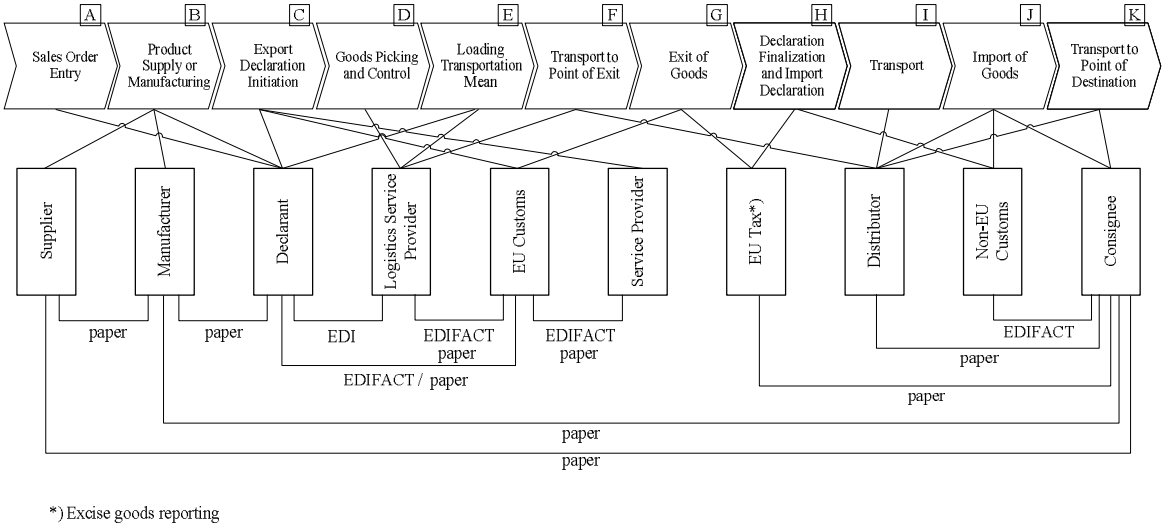


Figure 3.14: Standards usage experienced in network b)

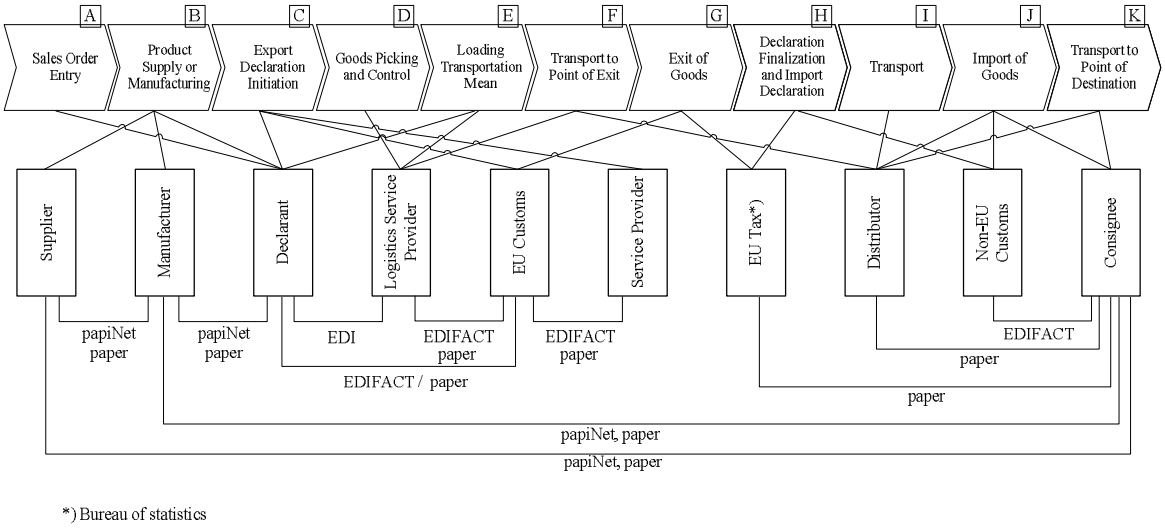


Figure 3.15: Standards usage experienced in network c)

3.5 Concluding the Reference Framework

By reflecting the evolvement of industry standards and the impact on B2B collaboration, it is an ambitious goal of the EU government to develop and deploy a multi-site, international, and integrated application suite for business and governmental

actors. Five elements have been identified that are subject of this objective: regulations, standards, inter-organizational processes, as well as roles and responsibilities of collaborating actors. Legislation expects highly integrated and standardized applications as outlined in regulatory documents. However, governmental actors struggle with design and deployment of these.

Standards used in the observed scenarios still focus on B2B interactions and reside within their industry. Standard development organizations do not provide generic data sets that embrace multiple industry-specific standards. A generic data set supports semantic standardized data elements and serves any actor roles' needs in B2G collaborations. Following the reference framework, the focus of collaborating actors concerned the applicability of industry standards to overcome paper based processes and manual data exchange. Table 3.17 summarizes the situation to-date and concludes the study of the reference framework.

Table 3.17: Expectations and to-date situation of standards

B2G actors expect standards to	Standards to-date
Connect multi-site, international, and integrated applications	Are as many as industries exist
Ease the fulfillment of regulatory requirements in data and document processing across industries	Offer proprietary data sets, mostly based on XML and EDI
Overcome industrial and organizational boundaries	Limit standards to inter-industrial collaborations and are not compatible across industries Fulfill industry-specific needs

4 Collaboration Models

4.1 Introduction

Emerging from commercial environments that cooperate and compete, collaborators are actors that share a common purpose (cf. Riemer & Klein (2006), p. 6). Relevant to this dissertation, the purpose to form a network consisting of multiple, known and unknown actors is driven by organizations' interest to develop, share, coordinate, and exchange common activities (cf. Ebers (1999), p. 3-4). Actors shape scope and edges of their collaboration based on competitive and value driven needs (cf. Bjørn-Andersen, Henriksen, & Larsen (2004), p. 2). Individual actors that initiate, form, and join networks perform roles according to their level of interest in the network, expertise, and offering to the market (cf. Hess (2002), p. 7-9). The following sections provide an overview on such forms of inter-organizational networks and filter criteria to assess business-to-government collaboration. Criteria that influence network formation, actor types, and binding elements are elaborated from the network overview. An assessment of network forms aims to reveal constructs and network formation specific criteria. It then concludes into necessary constructs of a procedure model and institutional steps necessary to form the B2G collaboration. The institutionalization of a trade-based B2G collaboration as presented in later in this dissertation is based on the findings of network formation activities.

4.2 The Concept of Collaboration

Collaboration as applied is understood as cooperating and competing activities that serve a commonly shared purpose among actors within a community (cf. Riemer & Klein (2006), p. 4-5). A network is an organizational form that expresses community-level interests of developing, sharing, and exchanging common interests that serve the overall purpose of collaboration (cf. Hess (2002), p. 14). Networks vary in format and composition. Networks in this work are composed of governmental and non-governmental actors (business-to-government or government-to-business, henceforth B2G). A collaboration model denotes structural elements of B2G. Further elements follow in the corresponding chapters and sections.

4.3 The Composition of Networks

Inter-organizational collaboration takes place in any environment, geographical markets, industries, and beyond (cf. Hess (2002), p. 9). Collaboration is apparent in various forms and therefore presented differently in research. Herein, the assessment of the work of Sydow, Wurche, and Klein concluded categories. Among them, nine were identified to describe networks in an IS environment: relevant organizational functions, industry focus, direction of the relationship, the geographical spread of the network, network control mechanisms and means, stability of a network and the scope of IS usage in a network (cf. Klein (1996), p. 126; Sydow (1999), p. 284-290; Wurche (1994), p. 132-133).

A key finding of the case study is the need to respond to network initiation and formation needs in B2G. Hess proposes a network typology based on network initiation and formation (cf. Hess (2002), p. 14-17). His approach is now further applied. In case of stable and unstable network initiation, stable networks characterize by repetitive, homogeneous activities that are carried out by the network participants. Examples are strategic networks and alliances. From an operational point of view, the attribute stable refers to repetitive activities in a pre-defined set of actors, for example monthly orders issued by a manufacturer and submitted to a pre-defined set of suppliers. Referred to as unstable networks, virtual networks initiate ad-hoc and target a purpose-driven initiation need, comparable to project networks that compose to deploy an IS solution or resolve a strategic project mandate. Unstable networks usually decompose after the completion of the work. Thus, unstable collaboration embraces non-repetitive, or randomly conducted activities in a dynamic or changing collaboration environment. The formation of a network triggers and accelerates by the options of access given to organizations: focal or polycentric access (ibid., p. 14-15). Focal access is encountered in power-centric networks where one organization or a small group of organizations dominate and control the entry to the network. Examples of focal networks are buyer-supplier based networks with a dominant market player or demanding organizations that trigger supply chain activities and production. Moreover, focal organizations tend to steer decisions and network-wide activities beyond network formation. Contrary to that, polycentric access is a form of uncontrolled access to a network. It allows any collaboration-seeking organization to pass the entry point and contribute to the network formation when wanted. The issue of scheduling the access has not assessed so far. Overall, timing plays a subordinate role in stable collaborations whereas instable and purpose-driven collaboration forms are often temporally restricted. Table 4.1 illustrates Hess' network typology and the above-discussed attributes.

Table 4.1: Network types

Source: Hess (2002), p. 16

	Unstable networks	Stable networks
Focal access	Project networks	Strategic networks
Polycentric access	Virtual networks	Alliances

At this stage, it is not clear if B2G networks are stable or unstable networks, both or neither of these two forms. The reasons are the following. In case of a single export event such as a single sales order, a B2G network forms to serve the purpose of the event and decomposes after concluding the export to the final destination and the corresponding customs management activities. In this case, business and governmental actors do not remain connected in the network or in other words do not collaborate further unless another export event occurs. In case of recurring sales, marketing, or other types of trade activities, B2G activities turn more into stable networks. Business and governmental actors know each other and know about the requirements to enter and stay in the collaboration. In other words, it is clear to the actors what is being expected from them in terms of customs management procedures, information exchange, forms processing, and legal requirements. Once conducted in more than one export event, the coupling of business and governmental actors is mid- or longterm oriented. Hereby, the coupling of business and governmental actors and their collaboration responds to the characteristics of stable, continuous networks such as pre-defined actors, repetitive and pre-defined activities. As described in the case study, a part of the sales revenue of a dairy products manufacturer results from constant export activities as for example to the Dominican Republic, the USA, and Russia. The case study revealed further arguments for recurring export activities. These are strategic decisions as for example to foster organizational growth abroad, enter new markets. Furthermore, the need to manage and streamline resource dependencies requires the establishment of international supply and distribution chains. On the other hand, changing supply and distribution chain partners affect the network setup instantly and hereby change the established network. In this case, the stable part is given due to governmental actors.

Further case studies are required to investigate the transformation potential of B2G networks transform into stable networks. To respond to the characteristics of B2G networks and the role of governmental actors in the relationship to other actors, the concept of Brass seams useful. He extends the assessment of networks and actors by focusing on the relationships among the actors to the discourse of network initiation and formation (cf. Brass (1995)). His research results are now further being explored. By

applying a social network perspective, he puts the network into the foreground compared to Hess' focus on individual organizations' constructs. The argument of Brass to undertake this shift is the following (Brass (1995), p. 3): "The social network perspective assumes that actors (whether they be individuals, groups, or organizations; rational or political) are embedded within a web (or network) of interrelationships with other actors. It is this intersection of relationships that defines an individual's role, an organization's niche in the market, or simply an actor's position in the social structure. It is these networks of relationships that provide opportunities and constraints, which are as much or more, the causal forces as the attributes of the actors." Hence, the baseline to network initiation and formation are relations, also often referred to as ties. These steer actor roles, groups of actors, relationship measures that relate to actors, groups, and the network as such. The terms are now further being described. The definition of a role of an actor results from the observation of an actor's position in a network (cf. Hess (1995), p. 7): "stars" are actors that are centrally placed in the network compared to "isolates" that have few links to others. In case of focal access, "gatekeepers" not only mediate but also control the flow between the network and other actors. In case of polycentric access the role of "liaisons" is important in a sense that liaisons have multiple links and support the connectivity of others, rather isolated actors to participating actors. Table 4.2 summarizes the characteristics of the assessed roles.

Table 4.2: Roles of actors in a network

Source: Brass (1995), p. 7.

Roles of Actors	Details of roles
Star	An actor who is highly central to the network
Liaison	An actor who has links to two or more groups that would otherwise not be linked, but is not a member of either group.
Bridge	An actor who is a member of two or more groups.
Gatekeeper	An actor who mediates or controls the flow (is the single link) between one part of the network and another.
Isolate	An actor who has no links, or relatively few links to others.

Actors that share the same characteristic of a role and therefore the relation to others in a network aggregate to actor groups. The differentiation of relations is useful to determine the position of an actor within the network and therefore the degree of connectivity among the actors. Further characteristics refer to tightness, looseness, strengths, and weaknesses of these relations. Any of these four relation types are being described by a combination of attributes. Relations that show a high degree of frequent and direct relations point to stable and strong relations. In case relations are less

frequent or set in place through a mediating effort of actors to others, the attributes presume that collaboration occurs randomly. Multiplex and symmetric networks provide an indication of the intensity and duration of the collaboration. Multiplexity defines more than one relation that takes place between actors. Symmetry defines bi-directional relations compared to relations that point to less collaboration-based relations. Examples of less collaboration-based relations are to delegate, mandate, and dictate. Symmetric relations are for example the exchange and share of activities and pairs of relations such as order-deliver and request-respond. For any of the above-introduced relation types, the strength of a relation derives from the analysis of the frequency and multiplexity of relations. Now, Table 4.3 point to the attributes and gives a brief description for each of the attributes.

Table 4.3: Ties in networks

Source: Brass (1995), p. 6.

Ties	Details of ties
Indirect links	Path between two actors is mediated by one or more others
Frequency	How many times, or how often the link occurs
Stability	Existence of link over time
Multiplexity	Extent to which two actors are linked together by more than one relationship
Strength	Amount of time, emotional intensity, intimacy, or reciprocal services (frequency or multiplexity often used as measure of strength of tie)
Direction	Extent to which link is from one actor to another
Symmetry	Extent to which a relationship is bi-directional

As outlined above, Brass supports the analysis of networks by proposing a structured approach to assess relations by various attributes and to assess networks by the characteristics of the relations (cf. Brass (1995), p. 1). The assessment is also useful as a checklist in the formation of a network and the maintenance of that network.

Unlike Hess, Brass does not use the relation-based analysis to classify networks and assign types of networks. It seems that Brass has one specific network in mind when he proposes measures of a selected network. Nine performance measures are proposed and introduced in Table 4.4. Each of the measures describes a network characteristic. Related work that referred to the measures to assess networks has been issued by (cf. Brynjolfsson & Kemerer (1996); Santos & Eisenhardt (2005), p. 495-496; Saloner & Shepard (1995); Wigand et al. (2005), p. 27-28). Three of them were considered to play a role in IT-enabled networks (cf. Markus, Minton et al. (2006), p. 33; Markus, Steinfield, & Wigand (2006), p. 88-89), as well as density (cf. Mignerat & Rivard

(2005), 13-14). Size is defined as the number of actors that participate in an observed network. Connectivity describes to which extent actors are linked, directly or indirectly, to other actors based on the possible links in a network (cf. Boutellier, Flügge, & Raus (2007), p. 12-14; Brass (1995), p. 5-6; Changizi, McDannald, & Widders (2002), p. 218). The measure of actual links that actors have amongst each other in the network compared to the possible links is known as network density. The measure of inclusiveness reveals the number of actors that collaborate with each other. The inclusiveness of pairs of collaborating actors is measured in form of connectedness. Comparable to an actor's position, the measure of centralisation helps to indicate that a network has a high degree of connectedness and inclusiveness. In terms of symmetric and asymmetric networks, symmetry of networks correlates to the symmetry of relations and indicates uncentered, actor-to-actor collaboration with a high degree of bi-directional relations. Unless an actor enters the collaboration to others through already connected actors, the collaboration in a network is more intense than in star-managed networks.

Table 4.4: Measures of networks

Source: cf. Brass (1995), p. 8.

Network measure	Description
Size	Total number of actors regardless organization size and type
Connectivity	Extent to which actors in the network are directly or indirectly linked.
Density	Actual links compared to possible links in the network.
Inclusiveness	Indicates total number of actors minus not-connected actors.
Component	Indicates highest ratio of connected actors by which all nodes are connected within the component.
Connectedness	Ratio of pairs of nodes that are mutually reachable to total number of pairs of nodes.
Centralisation	Used to indicate most central actors compared to other actors.
Symmetry	Ratio of symmetric to asymmetric links.
Transitivity	To be transitive describes connectivity of two actors through a third one (triple). Transitivity is the ratio of actual triples compared to possible triples.

The following example illustrates how to apply the measure-based analysis in a network and draws from the conclusions of Kipp et al. (cf. Kipp et al. (2006), p. 19-20). The example refers to network c) of the case study (see **Table 3.4**). Any network details and measures are applicable in the document of Kipp et al. (Kipp et al. (2006)). Network c) is comprised of suppliers, manufacturers, service providers, and logistics service providers in the paper sector in Finland. The Finnish paper sector is dominated by three large companies, which together account for the major part of the whole turnover of the

Finnish forest industry. Two major concerns network actors raised are the manner of how to manage international sourcing of raw material and how to process customs requirements for the high volume of paper and board products' export. Roughly, 90% of the finished paper and board products are meant for export. The concern to cope with customs activities does not only refer to the high export volume, but also to the heterogeneous character of the network. The network in this case is dominated by one large multi-national company. On the other hand the manufacturer faces the challenges to involve a large number of suppliers that sum up to roughly 5000 regional suppliers that can get involved in the supply of material to the productions sites in the South Karelian region of Finland. It is reported that around 500 suppliers connect to a production site. The size of suppliers ranges from mini and small to medium-sized. One to less than 10 persons typically counts as mini organization. Compared to medium and large suppliers the mini and small sized suppliers are hardly equipped with in-house technology or IT capabilities. To overcome that burden one of the involved IT providers tested a standard-enabled information exchange for order and invoice processing across organizations. Overall, the multi-national company processes 20000 orders annually, 37000 shipments, and roughly 40000 invoices. The promotion of the standard led to the adoption of the standard by a part of the network. The other part did not apply the standard and continued with existing paper-based information exchange. The provider sees the potential for further sales and implementation transactions to organizations that did not order the payment service yet. By this, the provider takes density as a key measure to identify missing links and connectivity potential among actors. The analysis helps to identify number, characteristics, and further details of each of the unconnected actors. The measures of connectedness, connectivity, and inclusiveness complete the analysis. It revealed that the micro and small sized enterprises are connected to only a few of the medium-sized suppliers. To the other actors they remain invisible and therefore disconnected. The acceptance of the order and invoicing service was low. At this point, it is not clear a higher degree of intensity and connectedness led to a higher adoption rate of the solution. Concerning the role of the IT provider, the provider does not reveal a high connectivity within the network either.

Focusing back on collaboration research, besides Brass further related work investigates the analysis, definition, and evaluation of collaboration as such and factors that influence the composition of a collaborating network. Factors that relate to new institutional economics and strategy are elaborated by Damsgaard and Lyytinen (cf. Damsgaard & Lyytinen (2001), p. 198-199), Todeva and Knoke (cf. Todeva & Knoke (2005), p. 8). Collaborating actors that form to streamline innovation development and management are clustered and described by Chesbrough (cf. Chesbrough (2003), p. 36).

The societal aspect of networks and the position of actors within a network find entry in a number of research contributions. These are provided by Markus, Minton, Steinfield, and Wigand (cf. Markus, Minton, Steinfield, & Wigand (2006), p. 42), Wigand, Steinfield, and Markus (cf. Wigand, Steinfield, & Markus (2005), p. 12), Riemer and Klein (cf. Riemer & Klein (2006), p. 4-5), as well as Samuelson (cf. Samuelson (1954), p. 389). Riemer and Klein assess networks by differentiating firm, network, and environmental views (cf. Riemer & Klein (2006), p. 2). New to the assessment of Riemer and Klein, the environmental view captures external conditions of a network (cf. Cross, Borgatti, & Parker (2002), p. 3-4). The influence of transaction costs on actors' choice to join or leave a network finds entry in the research of Alt (cf. Alt (2004), p. 20-22), Reimers and Li (cf. Reimers & Li (2005), p. 30-31), and for example Samuelson (cf. Samuelson (1954), p. 388). The aspect of environmental influence on the initiation and formation of collaboration is part of the research of Alt (Alt (2004)), Fleisch (Fleisch (2001)), and Oliver and Ebers (Oliver & Ebers (1998)). Compared to these influencing factors, new institutionalism on the other hand applies institutional measures. With dedicated focus on regulative measures, Tolbert and Zucker assess the impact of compliance measures on intra-organizational activities (cf. Tolbert & Zucker (1994), p. 12-13). Gulati and Gargiulo focus hereby on governmental contingencies in inter-organizational relationships (cf. Gulati & Gargiulo (1999), p. 1464-1465), similar to Oliver and Ebers (cf. Oliver & Ebers (1998), p. 7-8) and Scott (cf. Scott (2001), p. 71-73). Scott applies partly the concepts of Gulati and Gargiulo as well Oliver and Ebers and analyses in existing case studies legislation-imposed procedures in inter-organizational relationships (cf. Scott (2001), p. 77-79). Apart from the study results, the analytical approach of Scott is helpful to researchers that seek to find a descriptive manual how to assess institutional influence in network relevant case studies. With respect to the influence of information technology (IT), the analysis of above-outlined work still shows a gap in investigating the role of IT (cf. Schwarzer & Krcmar (1995), p. 15).

In case of the above-applied example of network c), the analysis revealed that actors seek better integration with their supply chain partners regardless the size of the organization, but because of the partners' role in the network. The assessment of actor-actor relations between manufacturer and suppliers and between two or more suppliers, reveal the connectivity of actors to external partners. Hereby, the environmental analysis of the network discovered the role of the local community Lappeenranta City that is not part of the network yet (cf. deliverable 521, p. 50). Concerning Lappeenranta City, "Lappeenranta City has connection to over 120 high skilled software companies, which are able to develop the most interesting software and services, but the key issue is

to find the proper teams for each Living Lab case. Lappeenranta City has a long experience of running the regional test bed where multi-national companies, small and medium-sized enterprises, banks, operators and public organization can test the newest innovative technology and services. Lappeenranta City has launched several projects supporting the integration of European-Russian business" (Kipp et al. (2006), p. 50). Through the co-founded Lappeenranta Innovation Limited, the local community administration seeks to leverage the connectedness of small and medium-sized enterprises and consequently their competitiveness by the institutionalization of the innovation center. It offers business knowledge management, educational programs, and networking opportunities for its members. A systematic analysis of external conditions has not been made in the observed case.

Collaboration models that apply the above-discussed network measures and characteristics are the following:

- Inter-organizational strategic alliances (Gulati and Gargiulo (1999)),
- Inter-organizational collaboration (Hess (2002)),
- Transaction-cost based collaboration forms (Alt (2004)),
- Institutional inter-organizational collaboration (Scott (2001)),
- Social networks (Riemer and Klein (2006)).

Each of the models is now being further reviewed based on network initiation, actor types, actor characteristic, actor roles, actor's access to the network, actor-actor relation, forms of ties or linkages, tie or linkage characteristics, and environmental factors. Table 4.5 describes how the selected models cover each of the criteria. A discussion of the mapping results follows the table.

Table 4.5: Network formation elements

Elements	Gulati and Gargiulo (1999)	Hess (2002)	Alt (2004)	Scott (2001)	Riemer and Klein (2006)
Network initiation	To gain access to resources and cope with environmental uncertainty	Common goal oriented (tasks, resources, costs)	Common goal oriented (for example revenue, costs)	Institutional, regulatory, normative, societal, industry and market driven changes or common goal oriented	To cope with environmental uncertainty of a competitive environment
Actor types	Organizations	Organizations	Organizations	World system, Societies, Organizational fields and population, Organizations, and Organizational units	Individuals, Organizations, Industries, National States
Actor characteristic	Homogenous actors that fulfill alliance needs	Legally independent	Not specified	Homogenous actor types that fulfill network initiation needs	Not specified
Actor roles	Actors, subordinates based on hierarchical structures of alliances, information keepers, information seekers	Roles follow Brass' definition (star, gatekeeper, liaison, etc.)	Roles not further specified	Conceptions of appropriate goals, rights, responsibilities, and activities for actor types	Roles are stakeholder oriented (supplier, intermediary, customer); they differ in competence, size, and network position of actors.
Actor's access to network	Polycentric access, based on reputation, degree of information supply, and referrals from 3rd parties	Focal access (gatekeeper) Polycentric access (stars)	Dependent on common interests and trustworthy actors	Polycentric access	Dependent on value adding proposition and power of new actor
Actor-actor (collaboration direction)	Horizontal and vertical coordination forms mainly alliance oriented, connects to intra-organizational performance	Vertical coordination	Horizontal and vertical coordination	Horizontal, vertical, and cross-level coordination	Vertical coordination across suppliers, horizontal with competitors, or cross-sectional with technology companies

Forms of ties (linkages)	Structured ties, Task oriented, Resource oriented, Shared across actors	Task oriented, Formally coordinated, Contract based	Task oriented, resource or process oriented	Regulative, normative, or cultural-cognitive linkages such as laws, norms, procedures, and standards	Task oriented behavioral influenced
Tie (linkage) characteristics	Encapsulates needs, reliability, and competencies, of potential actors, cohesive ties	Not specified	Sequential, pooled, reciprocal, symmetric or asymmetric	Sequential, pooled, reciprocal, symmetric or asymmetric	Sequential, pooled, reciprocal, symmetric or asymmetric
Environmental factors that facilitate collaboration	Contingencies: necessity, asymmetry, reciprocity, efficiency, stability, and legitimacy	Other markets, industries, competitors	Not specified	Institutional functional, social, political, and technical facilitators driven by isomorphism, stability, legitimacy, necessity, and efficiency	Other markets, industries, regions

Reflecting upon the assessment of collaboration models to network formation elements, each of the above-introduced models applies the criteria. Any of the assessed models point to organizations as network participants. Scott, Riemer and Klein provided further specification of organizational types. Riemer and Klein point to collaboration variances caused by distinct actor types (cf. Riemer & Klein (2006), p. 30-32). Main reason lies in differing expectations in network coordination and supervision of networks. According to them, expectations differ in the selection of standards or business logics with which actors need to comply. Further details of standards inclusion are not provided. With respect to network initiation and participation, Alt, Riemer, and Klein regulate network initiation and participation based on common interest and objectives among actors. Same accounts for Gulati, Gargiulo, and Hess. With respect to further forms, ties in strategic networks, alliances, and social networks are not based on regulations nor have they been assessed to introduce regulatory ties. They are rather task oriented and influenced by organizational behavior. Gulati and Gargiulo however draw attention to the mandate of regulatory and legal institutions that stimulate ties and the formation of strategic alliances (cf. Gulati & Gargiulo (1999), p. 1460). Concerning actors involved, Gulati and Gargiulo do not specify whether governmental institutions become active partners in the network or remain an external trigger (cf. Gulati & Gargiulo (1999), p. 1472). Though Riemer and Klein point directly to stakeholder types such as customers, suppliers, and intermediaries, they do not include governmental actors (cf. Riemer & Klein (2006), p. 14). Unlike an actor centric approach, Scott denotes external institutional factors and points to regulatory, normative, and behavioral sources that lead to network formation. Furthermore, he addresses the role of standards as one form of linkages that bind actors together. With respect to network participation, Scott's model allows any actor to enter the collaboration. It does not restrict collaboration to certain actor types or collaboration direction contrary to vertical, industry driven collaboration forms or horizontal, consensus-based alliances. In accordance to Hess' typology of networks, the above-assessed collaboration models from **Table 4.1** and **Table 4.5** merge into Hess' structure as outlined in Table 4.6.

Table 4.6: Alignment of collaboration models and network types

	Unstable collaboration	Stable collaboration
Focal access	Project networks (Hess 2002)	Strategic networks (Hess 2002)
Polycentric access	Virtual networks (Hess 2002) Virtual company (Hess 2002) Temporary transaction-cost based cooperation (Alt 2004)	Strategic Alliances (Gulati and Gargiulo 1999) Social networks (Riemer and Klein 2006) Unlimited transaction-cost based cooperation (Alt 2004) Institutional collaboration forms (Scott 2001)

4.4 The Composition of B2G Networks

The previous section introduced structural elements of networks. In accordance with Hess, the selection of appropriate network forms results from the need of further investigation (cf. Hess (2002), p. 43). The applicability of standards in trade requires further investigation in structural elements of B2G collaboration.

Research that addresses some of the B2G collaboration characteristics derive from B2B, organizational, institutional, or IS related research. Collaboration as outlined above refers to the construct of collaboration among actors, ties, and mode of operations. Trading communities are used as synonyms for collaboration models. They are defined as the "extent to a firm's customers, suppliers, and other vertical partners in its trading community" (Zhu, Kraemer, Gurbaxani, & Xu (2006), p. 523). Compared to B2G networks, trading communities are still vertically oriented. However, Reimers and Li added the dimension of governmental institutions in two ways: a) as an active business partner regulating the construction of the network and b) as an active partner in supply chains (cf. Reimers & Li (2005), p. 309-310). The latter one refers to as 'regulated trading community'. The term 'ecosystem' as applied in some work derives from strategic research. It allows assessing synergetic benefits, dependencies, and effects among actors. Thus, since "firms exist within an ecosystem together with other firms, institutions and actors, even minor actions in one part of the system have consequences for other parts of the system" (Jarzabkowski & Wilson (2006), p. 353). Ecosystems are applicable to B2G network formation criteria however lack B2G relevant details. So far, researchers investigate the synergetic effects of business networks compared to those in ecosystems (cf. Galunic & Eisenhardt (2001), p. 1234; Iansiti & Levien (2002), p. 5-7; Matutinovíc (2002), p. 421-423). A small number of studies exist that support to draw upon findings in collaboration formation from B2B studies and to compare them to B2G

Studies (cf. Scholl, Barizilai-Nahon, Ahn, Popova, & Re (2009)). The review results and criteria for B2G network composition are introduced below in Table 4.7.

Table 4.7: Criteria to form B2G networks

Network characteristic	Description	Source
Unlimited access	Unlimited access to the network allows any actor regardless of geographical spread, industry, or size to participate in the collaboration.	cf. Krcmar H. (2006), p. 5, 19 cf. Scholl, Barizilai-Nahon, Ahn, Popova, & Re (2009), p. 1-2
Homogeneous actor types	The activities of network participants are based on the role participants fulfill in the network. They distinguish business and governmental actor types.	cf. Grönlund, A. (2005), p. 4-5. cf. Krcmar H. (2006), p. 4 cf. Peng, M.W. & Zhou, J. Q. (2005), p. 325 cf. Reimers & Li (2005), p. 309-310
IT appeal	Network promotes use of IT. It does not prohibit use of IT.	cf. Grönlund, A. (2005), p. 5 cf. Krcmar H. (2006), p. 3 f., 17 cf. Scholl, Barizilai-Nahon, Ahn, Popova, & Re (2009), p. 3
Focused collaboration	Network participants develop, share, coordinate, and exchange trade-relevant activities.	cf. IeB (2002), p. 66 f. cf. Krcmar H. (2006), p. 3-4
Regulation based ties	Network construction is based on ties that result from regulatory requirements.	cf. IeB (2002), p. 67 cf. Peng, M.W. & Zhou, J. Q. (2005), p. 328
Transferability of network	Network is transferable to other trade markets.	cf. Peng, M.W. & Zhou, J. Q. (2005), p. 328-329 cf. Iansiti & Levien (2002), p. 5-7
Connectivity of network	Network connects with other networks.	cf. Krcmar H. (2006), p. 17 cf. Peng, M.W. & Zhou, J. Q. (2005), p. 328-329

Network forms that are used in this thesis (see **Table 4.5**) meet above-introduced B2G criteria as follows (Table 4.8). Due to the nature of long-term collaboration needs with unlimited access to actors in B2G, the attribute of unstable collaboration seem not to be applicable to business-to-government collaborations. B2G activities in this work however relate to export oriented activities that relate to a single sales order or delivery activity. Thus, the collaboration is initiated because of a single instance, a sales order for example. In this sense, a network composes to process the sales order and product flow and decomposes after the completion of the work. Repetitive, homogeneous tasks imply stable, long-term oriented networks. As presented in the case study, customs relevant activities institutionalize because of regulatory requirements. To actors like consignors the process steps for any of their sales orders contain a homogeneous set of

activities that relate to customs declarations, forms, and export certificates. These are relevant for any export business they undertake. They might vary due to import regulations or industry-specific declaration and information requirements, but persist to be the core of any B2G relevant transaction. By this, B2G collaboration with dedicated focus on customs and export implies stable networks. The case study revealed the longterm connectedness of actors in a customs related B2G collaboration. Resulting from this observation, B2G collaboration references to stable networks.

The case study revealed that organizations seek stability in daily business operations to respond to forecasted, longterm customer and supply chain demands. The analysis of the studied networks showed a stable environment with known business partners. However, the networks did not reveal plans to enter new markets or regions that led to a network initiation and formation assessment. Given the mandate of governmental and non-governmental institutions to ask B2G participants to become accredited and therefore to prove their interest in a longterm-based collaboration participation schema, B2G collaborations are rather stable than instable. Governmental actors as demonstrated in the case study are active collaboration partners that stabilize the network based on their pre-defined roles and responsibilities. The case study however reveals the need to explore distinct roles of actors, their characteristics and their influence on network initiation. So far, network research focused largely on B2B scenarios and spared the role and influence of governmental actors. Concerning network formation, the access to B2G collaborations is steered by compliance needs that are issued by governmental participants prior to the network initiation. Arguing with the need to become regulation compliant, the network access is legitimated. Organizations that prove legal compliance are legally sanctioned and therefore the collaboration is formally sanctioned (cf. Scott (2001), p. 52). Having passed legitimacy, any organization that seeks to export to any region is allowed to access the collaboration. It is not limited or restricted by another organization or group of organizations. With that respect, the access to B2G networks appears polycentric. Concluding the assessment of B2G characteristics, the observations in this section claim that B2G networks are defined as a stabilized collaboration that gives actors uncontrolled access to the network. Their fit to Hess' network types is illustrated in Table 4.8. As outlined in Table 4.8, the access through legitimacy specifies polycentric access as legitimacy-enabled polycentric access.

Table 4.8: Fit of B2G to network types

	Unstable collaboration	Stabilized collaboration
Focal access		
Legitimacy-enabled polycentric access		B2G

4.5 Regulations as Building Element in B2G Networks

4.5.1 The Concept of Regulation and Statutory Law

To survive in the competitive space any organization needs to be capable to connect to any collaboration partner and still be regulatory compliant. Under the lens of strategic objectives, the organization's choice of strategy influences the inter-organizational alignment. Alignment ranges from controlled and therefore predictable business partner relations, opportunistic and adaptable to consensus-driven and collective action-based collaboration (cf. Mintzberg & Waters (2006), p. 269-270). Regardless the chosen alignment type the choice should not neglect the need for connectivity and the mandate of regulatory requirements. As depicted by Scott connectivity requires forming and stabilizing constructs that guide organizations in strategic and daily operations (cf. Scott (2001), p. 82-84). These characteristics apply to regulations. This section focuses on regulations, international and national legislation dependencies. If not explicitly stated, legislation in this work refers to statutory law.

Statutory law is enacted and constituted by legislature. Concerning conduct of states and inter-governmental organizations, statutory law refers to public international law. It addresses international interests of states and intergovernmental organizations, as for example world trade interests. The United Nations is the forum that facilitates governance of statutory law internationally. European Union (EU) law is defined as statutory and supranational law. It constitutes new legal order for the EU through supranational legislation mechanisms and European legal instruments that are binding in their entirety and directly applicable in all Member States (European Communities (1995-2008)). Following geographical applicability, EU Member States choose to which extent directives are being implemented on national level (Table 4.9). Besides supranational law, statutory law is applicable to further geographies, issuing federal, state, local law and domain specific procedures (cf. Otto & Antón (2007), p. 2-3).

Ideally, any form of legislation allows traceability of its elements among obligations and constructs, as well as top-down from supranational to national, state to local level for example. Table 4.9 gives further examples of geographical applicability.

Table 4.9: Geographies in which statutory law applies

Geographical applicability of statutory law			
Supranational (EU) level	Federal or national (i.e. Australia, U.S.A, EU countries)	State level (i.e. U.S. States, Australian States)	Local level (i.e. municipal authorities)

Statutory law contains some or all of the following: regulations, directives, decisions, and recommendations. Regulations stand for enacted law. They are binding within their geographical boundary, for example national law or EU law. Regulations are self-executing and do not require implementing measures. Regulations as such have mandatory, permitting, and prohibiting elements. Those are expressed in obligations (henceforth mandatory), permissions and rights (henceforth permitting), and prohibitions (henceforth prohibiting) (cf. Breaux (2006), p. 1; Kabilan, Johannesson, & Rugaimukamu (2003), p. 7-8). Rights permit and obligations ask stakeholders and business partners to perform specific actions (cf. Breaux (2006), p. 1). The interplay of rights and obligations is apparent in questions as to which regulations influence application design and to what extent business practices are following (cf. Antón & Earp (2000), p. 5-7). Further legal instruments are directives, decisions, recommendations and opinions (cf. Lux (2007), p. 21-23). Directives bind the receiving party to the results they aim for. At EU level, directives transpose into national legal frameworks of each of the EU Member States. Transposition is a maneuverable margin as to which form and means directives become enacted. Thus, EU Member States are not dictated to apply or use a particular mean for the execution of directives. Further elements of statutory law are decisions, and recommendations and opinions. Decisions are fully binding to whom they are addressed. Recommendations, opinions, as well as legally imposed procedures are non-binding, declaratory instruments.

To ease legislature complexity supplementing guides complement statutory law (cf. Lux (2007), p. 26). They are available in the form of printed material such as documentation and reference handbooks or as interpretation and consulting support, similar to case law. Legal and non-legal experts typically carry out documentation and interpretation activities. The question to which extent flawlessness and clarity are achievable in legislation triggered the research field of legislation modeling. Cheng, Lau, & Law (2007) undertook research in the systematic analysis of legislation and paved the way for the analysis of complementing material. In their approach, they argue about the

underlying structure needed to complement one regulation in an unambiguous format. In case supplemented documentation is incomplete or misleading, law processing becomes error-prone and inconsistent (cf. Otto & Antón (2007), p. 1-2). Non-legal experts might increase the risk of misinterpretation. Potential drawbacks are inconsistent application design and non-compliant business processes. From a societal perspective, anomalies in legal behavior occur if logic breaks and plausibility checks fail. Certainly, clarity in supplemented guides conditions the applicability of law. The readability of law improves with clearly described guides. Even more, the reusability of elements of legal structures enhances the practice of legislation. Therefore, legislation engineers apply engineering techniques, procedural descriptions, and regulation modeling (cf. Trcek (2000), p. 818; van Engers et al. (1998), p. 2-3). Regulation modeling compared to business process modeling is a possible mean to represent law and legal elements in a formalized manner (Lau et al. (2004)). Investigation in this field started with formalization of security (Trcek (2000)) and privacy policies (Otto & Antón (2007)). Promoted techniques were UML and goal-based modeling (cf. Otto & Antón (2007), p. 65). One of the outcomes they prospect is to encourage legislation designers to reflect upon design and logic of legal acts. The legislation architecture embraces building blocks such as regulation models, functional, technical, and implementation related elements.

Deciding to what extent international law and conventions are adopted by supranational and national legislation depends on the implementation methods that local legislation chooses. Implementation variances are mainly expressed in the degree of transposition (cf. Lux (2007), p. 20). Degree differs from direct or partial application of legislation, with or without transposition, with or without additional deployment efforts, and inclusion of guidelines and explanatory notes that will be adopted. With respect to international conventions, they transpose to statutory law following national and supranational implementation methods (Figure 4.1).

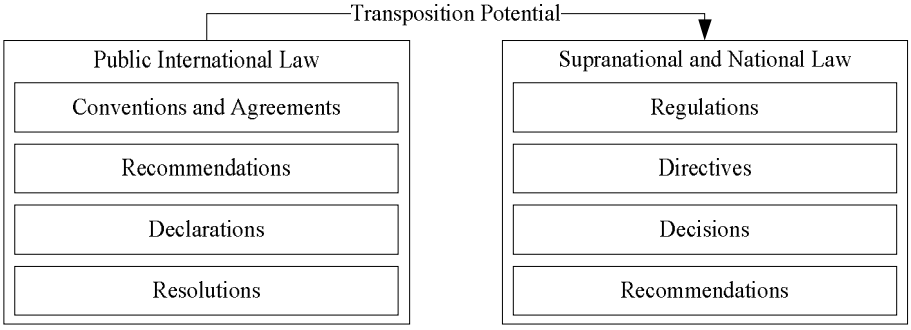


Figure 4.1: Transposition potential from public international to (supra-) national law

4.5.2 The Localization of Customs Management in Statutory Law

Legislative elements and structures in international collaboration in the area of customs refer to trade legislation as follows. The World Customs Organization (WCO), recognized as an intergovernmental organization, issues on behalf of to-date 174 participating countries customs conventions, recommendations, and further guidelines for trade and customs regulation (cf. WCO (2009), p. 1). International law transposes to national legislation based on national and supranational legislation. Contracting parties to WCO are formally customs administrations. Uniquely to the EU, the EU Customs Union is a member of WCO as well as each individual EU Member State.

Organizations find reference and guidance to trade matters on the international and national level. By addressing any WCO member, an appropriate subject of investigation is the Revised Kyoto Convention (cf. WCO (2000, 2004, 2006b)): international and national regulatory measures that affect business-to-government interactions in trade are tightly linked to that convention. The Revised Kyoto Convention addresses the need of simplification and harmonization of customs procedures. Issued by WCO in 1999, it entered into force in 2006 and transposes to any of the WCO members. The convention intends to respond to the increasing complexity of security, and address any business and governmental textures in global supply chain activities. EU and national procedures and laws in trade transpose from conventions such as the Revised Kyoto Convention. Within the EU, the EU Customs Union regulates this transposition in the Common Commercial Policy in Article 133 of the European Community Treaty (cf. European Commission (2009), p. 51-53). Thus, the present work needs to take into account international, non-governmental imposed conventions and their interplay with supranational and national law. Furthermore, national, statutory law issues trade relevant legislation in specific formats and types (Table 4.10). In addition, Table A.9.2 provides a broader selection of publicly commonly discussed regulations (see **Table A.9.2**), while Table A.9.3 provides further publications that are useful as supplementing material to this topic (see **Table A.9.3**).

Table 4.10: Scope of trade legislation in present work

Trade relevant legislation	
International Conventions	
	International Convention on Simplification and Harmonization of Customs Procedures (henceforth Revised Kyoto Convention) (WCO (2000)) consisting of Kyoto ICT Guidelines, SAFE Framework of Standards and WCO Customs Data Model (WCO (2004))
European Union related supranational law	
	The Community Customs Code is complemented by Draft Modernized Customs Code TAXUD/458/2004 Rev. 4, the legislative pillar of e-Customs (TAXUD (2004)) [EEC-2454/93] Community Customs Code Implementing Provisions, Commission Regulation (EEC) No 2454/93 (European Commission (1992)) [MASP] Electronic Customs Multi-Annual Strategic Plan, TAXUD/477/2004 – Rev. 7, steering the execution Community Customs Code activities by governmental institutions (European Commission (2006c)).
EU Member States specific national laws with general applicability	
	Applying Community Customs Code (CC) 19 on the basis of Art. 26, 95 and 133 EC Treaty, since 1 January 1994 (Art. 1 sentence 1 Customs Code) (European Commission (2009)).

Now, customs legislation encompasses the following. The European Union decided to cope with customs challenges as perceived by the WCO by issuing the Multi-Annual Strategic Plan (MASP) of the European Commission (cf. European Commission (2006b), p. 607-608) and redesigning legislation through the Modernized Customs Code. MASP covers a series of procedural and IT-based applications as depicted in Sections 3.4.1, 3.4.3, and 3.4.4. Herein, similar to the above-outlined Revised Kyoto Convention, the European Commission releases expectations and guidelines for the Economic Operators' registration, identification, and authorization. The Modernized Customs Code is the legal basis for the MASP and describes aspects, expectations, and arguments for an electronic environment in governmental and business organizations (cf. TAXUD (2004), p. 489). Projects underneath the Modernized Customs Code result in the deployment of a fully automated export and import system (AES and AIS), and an Integrated Tariff Environment (the latter being built on continuing work). The vision of a paperless environment for customs activities is accelerated in amendments; one of which is the Single Window project (cf. European Commission (2006b), p. 488).

The connection between the Revised Kyoto Convention and European legislation is expressed in the degree of transposition. With respect to the Revised Kyoto Convention, the European Community decided to transpose directly the General Annex of the Convention (Figure 4.2). The General Annex covers definitions and basis rules for any Customs Code.

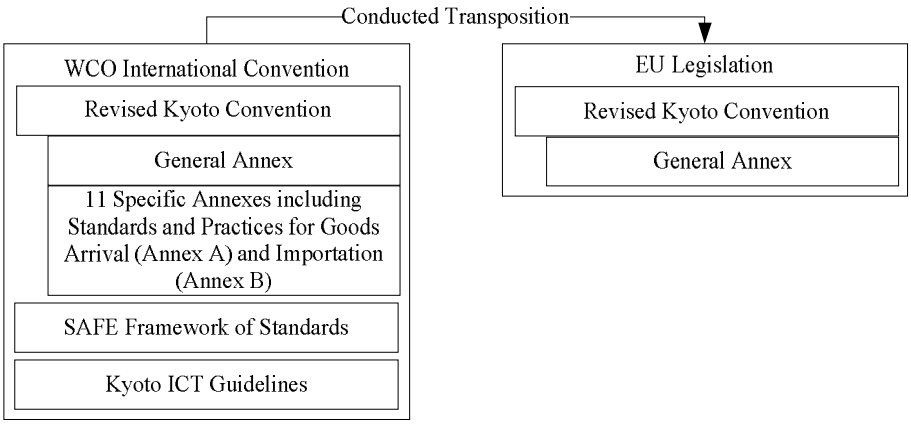


Figure 4.2: Transposition from the Revised Kyoto Convention to EU legislation

Despite the fact that EU and individual EU member states are members of the WCO, the European Community did not adopt nor implement any Specific Annexes of the Revised Kyoto Convention (cf. Lux (2007), p. 21-22). Usually Specific Annexes regulate standards and recommended practices for customs and security. Rather than adopting those, the EU decided to revise the Community Customs Code and set into operation the Modernized Customs Code and the Multi-Annual Strategic Plan (MASP) (cf. Wolffgang (2007), p. 14). Under Council Regulation TAXUD/458/2004 - REV4, the Modernized Customs Code is the central building block to set the legal path for paperless environment in customs and trade. Underneath the MASP, it monitors the implementation of e-Government on the EU and EU Member State level. It aims to undertake e-Government projects with less complexity and better structured rules to ease customs management. The core building blocks of EU legislation for e-Government are illustrated below (cf. TAXUD (2004)) (Figure 4.3).

Figure 4.3: Building blocks of EU legislation in trade and customs

The reasons for the partly adopted Revised Kyoto Convention and the potential impact of missing adoption and implementation of the convention opens further research

objectives that are beneficial to the discourse of the local transposition of globally passed directives. As these objectives are not part of this dissertation, they leave room for future research.

4.6 Summary

This chapter provided the reader with the basics of inter-organizational networks, formation criteria, and the applicability of formation criteria such as regulations in B2G collaboration forms. It further discussed network forms and concluded in the choice of an institution-based network model. The most relevant insights from this chapter are as follows:

- In this dissertation, collaboration is understood as any cooperating and competing activity that serves two or more actors in a given network. Actors are commercial and governmental organizations. Actors share a common view on what needs to be shared in the network to cooperate. The competitive notion of collaboration is understood as a stimulus for collaboration. Collaboration appears in form of networks that develop, share, and exchange common interests. Four types of networks have been identified that suit the presented research objectives: project networks, virtual networks, strategic networks, and alliances. The network types differ in tightness, looseness, strengths, and weaknesses. Besides ties, network types differ in their composition by actors. The role that actors perform in a network is directly linked to their position in the network. If actors become isolated or connected to a small number of other actors, they have weaker and less dense relationships than actors that act as gatekeeper or star in a network.

- The investigation in further structural elements reveals the need to assess the following: the reason for the network formation (network initiation), actor relevant types (individuals, organizations, and organizational populations), characteristics and roles (alike or distinct organizations), how access is provided to the network (polycentric or focal), collaboration direction (horizontal, cross-level), and environmental factors that influence actors and the collaboration. The comparison of five network forms discloses the fit of Scott's Analytical Framework II to networks that are initiated by regulative forces. His model fits best to the underlining concept of this work, the B2G collaboration, and is therefore applied in the subsequent assessment of standard-enabled B2G collaboration.

- Research in standard-enabled B2G network initiation and formation is to-date highly related to B2B network research. Main reason for the focus on B2B networks is the focus on vertical standards and their impact on collaborative thus industry-led environments. The inclusion of governmental actors started recently through the addition of governmental institutions in industry-related network research. Originated in regulated trading communities, IS research delineates B2G network characteristics: unlimited access, homogeneous actor types, IT appeal, focused collaboration, regulation based ties, transferability and connectivity of the network. Hence, B2G networks are encountered as stabilized networks that do not control access to the network. Still, the role of governmental institutions is unclear. Furthermore, the inclusion of institutional, regulative forces requires a collaboration format that copes with the influence of regulative forces on business as well as governmental actors. Hess' typology assessment does not yet respond to these emerging research needs. The use of Scott's Analytical Framework II in this work and the learnings and conclusions that can be drawn upon will provide further insights into the research.

- To respond to the required insights in regulative forces, four geographical types of regulative forces have been identified: supranational, federal or national, state, and local level. These types are representing statutory law that is enacted and constituted by legislature. In the context of this dissertation, customs-oriented B2G networks on a cross-country scale in export point to the first two types and in particular supranational and national law. The applicability of trade relevant statutory law depends on the selected implementation variances and the degree of transposition in particular. Transposition is defined hereby as a maneuverable margin as to which form and means directives become enacted. In customs, the occurrence of transposition-dependent adoption steers the national, international, and supranational handling of trade. Two key concepts of regulative foundations have been identified to further investigate B2G collaborations in the subsequently following rounds of design: the Revised Kyoto Convention issued by the WCO (cf. WCO (2000), p. 4; WCO (2004), p. 80; WCO (2006a), p.5) and the Modernized Customs Code issued by the European Community (European Commission (2004)),

5 Role of IS Standards in Collaborative Environments

5.1 Introduction

The main concern in today's collaboration research is how IS standards are perceived from multiple stakeholders' point of view. On the one hand, research contributions have been made to enlarge network effects and consider the role of IT penetration within and among networks (cf. Turowski (2000), p. 133-134; Zhu et al. (2006), p. 516). On the other hand, a standard's success grounds on relationships of influencers among each other and with the network itself (cf. Damsgaard & Lyytinen (1994), p. 5; (2001), p. 197). Business actors took into several account strategic considerations to pursue the utility of IS standards (cf. Winter (2003), p. 93). One of which is how to accommodate new business partners in an existing network and assess market potential and network growth (cf. Schmid & Lindemann (1997), p. 5). Another strategic consideration is to keep in mind global and local factors of collaboration (cf. Rosemann & van der Aalst (2003), p. 12-13). Global factors appreciate the nature of networks in which an organization is embedded. Compared to Brass' ties global factors take into account type, degree, industrial and geographical interactivity levels. They refer to countries, industries, and further external environmental factors such as regulatory boundaries. Contrary to that, local factors refer to intra-organizational processes and their configuration to suit individual organization's needs (cf. Mertens et al. (1997), p. 477; Österle (1995), p. 14-16; Schmid & Lindemann (1997), p. 49-50). Others conduct intra-organizational business process analyses and map results against reference models (cf. Rosemann & van der Aalst (2003), p. 3).

The remainder of the chapter is structured as follows: the presentation of observed standardization needs is followed by an introduction into standards terms and types. This prefaces an overview of the commencements of compatibility and the implication of compatibility on IS standards. By focusing on the applicability and effects of standards in export and customs management, dedicated focus is given on open standards and their effects. Effects are being observed from related work and a comparison of standard research in chosen networks. Additional emphasis is taken on the inter-organizational aspect of standards' use. Finally, the section concludes with the outline of an open standard development process.

5.2 Observed Standardization Requirements

Standards are recognized among product and non-product related characteristics. With respect to the compatibility of products, standards are held accountable for generating value in business networks. With respect to standard's relevance in information technology research, standards are credited with enabling integration between and among distinct technologies and applications. Contributions notably from David (1995), David and Greenstein (1990), Farrell and Saloner (1985, 1987), Shapiro and Varian (1999a) allowed an integrated view of and contributed to economic, organizational, and network effects of standards. Kotinurmi, Nurmilaakso, and Laesvuori (2003), Nurmilaakso, Kotinurmi, and Laesvuori (2006), as well as Lemm (2007) contributed to the field of IS standards assessment and comparison.

Understanding the different layers that are subject to standardization, Fleisch suggested the analysis of semantics and syntax in B2G collaboration (cf. Fleisch (2001), p. 142). Syntax defines the correct and complete transfer of information. Semantics secures the correct meaning of what needs to be transferred and uses identification, validation and synchronization functions (ibid.). Semantics provide common understanding to processes, messages, and services used among organizations (cf. Fleisch (2001), p. 142 f.; Legner & Vogel (2008), p. 39). Studies that apply that distinction add the need to assess the correct usage of information referred to as pragmatics (cf. Reichwald (1993); Schmaltz & Hagenhoff (2003); Weigle, Schwarzer, & Krcmar (1997)). An extended presentation of the concept of pragmatics, semantics, and syntax can be found in Reichwald (1993) and Fleisch (2001). The inclusion of semantics and pragmatics is supposed to gain higher flexibility in collaboration formation and expansion. It is expected that collaborations establish faster and with less effort than without the provision of common semantics and agreed pragmatics. Applying pragmatics as a conceptual element of standardization leads to the question whether a pre-assessment of collaborating partners is necessary or not. One study identified the need to assess and authenticate participating actors prior to standardization (cf. Fleisch (2001), p. 129-131, p. 140.). In this case, actors agree upon the collaboration and the details of the collaboration agreement. That input is then used for standardization. However, in customs management, a manufacturer or exporter does not always know the collaborating partners. Standardization then requires a generic approach independent from pre-known actors and transaction processing. The aspect of timing, thus when to standardize, has been addressed by Cargill (1989). Cargill argues that anticipatory standardization carries the risk of focusing on any detail of a standard including the less required standardization needs and missing the essentials (cf. Cargill (1989), p. 307). Furthermore, the standardization might take longer as the field of application of a

standard increases. Reasons are that the standardization community aims to anticipate any relevant and irrelevant details of a standard and include them in the standardization process. Anticipatory standardization then requires a separation of standardization requirements on technical, semantics, and operational level. Thereby, the agreement process on the syntax (technical) layer for example can take place in parallel to the agreement process on the semantics and pragmatics layers. The separation eases the separation of duties and identifies conflicting standard development efforts. Moreover, the three layers contribute to distinct viewpoints of standardizers. A developer of interfaces for example concentrates on the technical layer and implies certain standard prerequisites compared to an implementer that aims to align users' needs based on the business purpose that drives the standardization request. If combined in one standardization process, the alignment between an interface developer and an implementer is time consuming. The process of reaching consensus between the two standardizers lacks a logical connection based on the distinct expectations developers and implementers have (cf. Cargill (1995), p. 90-91).

5.3 The Concept of IS Standards

Following the discourse on standards in the case study, the term standard as referenced in legal sources and the context of IS research requires further clarification. The following section outlines an attempt to classify standards and to reflect on the term standard. The focus in this section is based on selected definitions of standards that are applied in IS research.

Standardization concerns different forms and perspectives (cf. de Vries (2006), p. 79). Due to the variety of standards that are available in the market they originate from different sources. One widely discussed distinction is the one of de jure and de facto standards. A de facto standard results from the assertiveness of individual organizations to initiate, deploy, and enforce the standard's use in the market (cf. Shapiro & Varian (1999b), p. 228-229). In this sense, the standardization efforts and the accessibility of the standard depend on the issuing organization. Far more diverse is the definition of de jure. In some research, de jure standards originate from regulatory action and have a legal mandate (cf. Brunsson & Jacobsson (2002), p. 46-47). With that respect, governmental actors would issue standards directly. Understanding a de jure standard as being issued exclusively by government, a standard then transposes fully into regulatory requirements and becomes mandatory (cf. Weitzel, Wendt, & Westarp (2000), p. 4). In some cases, government delegate the issue of standards to individual agencies such as

the National Institute of Standards and Technology (NIST) (cf. Department of Commerce of the United States of America (2004), p. 5; NIST (2008)) or give a mandate to non-profit organizations such as the British Standards Institute (cf. The British Standards Institution (2009)). In the latter case, the de jure standard is being deployed but not enforced by legislation. With that respect, the term de jure needs further clarification. A clearer definition of de jure than the above-outlined definitions is given by de Vries (2006). To him, a de jure standard has "an official seal of approval by a recognized authority" (de Vries (2006), p. 10). Herein, de Vries implies that any organization that formally approves a standard issues a de jure standard. That includes standard development organizations (SDOs). In case standards are "set by a governmental agency", de Vries refers to "governmental standards" (de Vries (2006), p. 11). It is assumed that standards often result from "anticipatory (or prospective) standardization" (de Vries (2006), p. 12). In this case, it is expected that standards fulfill future issues of users and implementers. Compared to anticipatory standards, retrospective standards solve present standardization needs and concurrent standards solve them as soon as they occur (cf. de Vries (2006), p. 12). At this stage, it is not possible to map de jure and de facto to either one of these categories.

Another classification schema concerns the application of a standard. It distinguishes voluntary and mandatory use of a standard. A mandatory standard in the context of this dissertation is considered to be legally enforced thus legally binding (cf. Brunsson & Jacobsson (2002), p. 46-47). Its use requires to follow conformity guidelines and to accomplish compliance based on a set of criteria (cf. Stephenson (1997), p. 9-10). By this, the issuing party proposes mechanisms such as certification and accreditation programs, self declarations as well as further requirements such as conformity testing to ensure compliance. Conformity is one instrument that allows governmental actors to mandate or promote conformity (cf. Fomin, Kühn Pedersen, & de Vries (2008), p. 27). It does however not necessarily result in the deployment of a compliant standard (ibid.). Conformity as proposed in the National Institute of Standards and Technology (NIST) Special Publication 951 applies the definition for conformity issued by the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC): conformity is "any activity concerned with determining directly or indirectly that relevant requirements are fulfilled" (Delaney & van de Zande (2000), p. 7-8). The addressees of a mandatory standard experience legal or even economic sanctions in case they do not apply the standard in a correct manner. In case of a voluntary standard, the issuing organization emphasizes the use of the standards throughout its products and offerings (ibid., p. 42). Further activities that outline the difference between voluntary and mandatory standard making are made available by Stephenson (1997). Brought into

the market by market players and interest groups, voluntary standards are not binding and implementation is not regulated (cf. David (2000), p. 46). Most IS relevant standards are often referred to as voluntary standards (cf. Turowski (2003), p. 87). Its users and collaborating partners decide to which extent they want, need, or neglect to apply the standard. However, in the case of a dominant market player, that incorporates the standard, the collaboration network and consumers find it hard or even impossible to refuse the standard's use.

A further attempt to classify standards concerns the distinction of accessibility of a standard by differentiating open and proprietary standards. What is meant with open? Krechmer outlines three aspects that result in different understandings of open (cf. Krechmer (2006)): the creator's viewpoint, the implementer's viewpoint, and the user's viewpoint. One of them relates to the user's point of view and the aim of achieving compatibility. Implementers of IS applications perceive a standard as open if it is applicable by multiple implementers (cf. Shapiro & Varian (1999b), p. 27-29). Hence, a standard in form of open interface opens a product or component to be attachable to other products or components (ibid.). A consensus among implementers is then required to achieve this (cf. Krechmer (2006), p. 47). Openness could also stand for the technical capability of a product or system to supplement other products and systems (cf. Farrell & Saloner (1985)), adapters (cf. Chakrabarti, Alfaro, Henzinger, Jurdzinski, & Mang (2002)), or systems (cf. Buxmann, Weitzel, & König (1999)). Now, an open product or system perceives to be accessible by the public domain, thus vendors and other parties that are interested in the use of the standard. The standard is ideally accessible with no entrance fee and no charges are involved to receive the specification and documentation (ibid.). Ultimately, open products, systems, and standards then transform into public goods (cf. David (2000), p. 29).

A further point of view is the creator's view on the openness of a standard. In many cases, these creators are SDOs. SDOs focus on successfully adopted standards achieved by open documentation and publicly available specification (cf. Krechmer (2006), p. 47). If open standards are perceived to be free-of-charge, the main difference of proprietary standards to open standards is the cost factor. Costs affect the involved actors in case they access, use, or further develop the standard. Furthermore, compared to SDOs that maintain open standards, proprietary standards are the outcome of a particular organization or a group of organizations, the so-called standard provider. The handling of a proprietary standard depends on the strategy of that standard provider. One strategic option is to limit intentionally its accessibility to keep the standard knowledge inside to market the products that apply the standard and leverage the

competitive advantage. Another option promotes the spread of the standard because of the value proposed despite access, maintenance, and other efforts. In case a standard provider succeeds in the promotion of the standard, the initially perceived negative impact of the proprietary standard turns into a positive one. If not, users will be locked-in and decide to retain or neglect the use of the standard. On the other hand, a proprietary standard becomes accepted once the issuing organization is capable to demonstrate the benefit of the use of the standard and other implementers and users ignore the potential influence of the assigned intellectual property rights. Concerning those organizations that issue standards, David and Monroe assessed the role of coalitions, committees, and SDOs (cf. David & Monroe (1994), p. 11-12). It is assumed that SDOs account for the issue of open and voluntary standards (cf. Krechmer (2006), p. 47). Among other interest groups, market players, brand leaders, and software providers are held accountable for proprietary standards. SDOs seek payoffs among their members and the community as such. Some of them account for the issue of open standards (cf. ISO (2009a)), p. 1; W3C (2009a), p. 4). Others however issue standards that are liable for costs (cf. RosettaNet (2009)). Sponsors of proprietary standards on the other hand consider holding property rights and the possibility to restrain the use or development of the standard if wanted (cf. Besen & Farrell (1994), p. 125 f.; P. A. David & Monroe (1994), p. 14).

The distinct viewpoints by creators, users, and implementers are helpful to determine different meanings of open (cf. Krechmer (2006), p. 48): open meeting, consensus, due process, open world, open intellectual property rights, open change, open documents, open interface(s), open use, and ongoing support. Following Krechmer's schema, one main differentiator to proprietary standards is that a proprietary standard locks the intellectual property rights whereas openness implies unlimited and cost-free access by users and implementers. Once imposed in business collaborations, both open and proprietary standards have the potential to transform into de facto standards. One of the main reasons is that business partners will not see other alternatives other than using that standard. Otherwise, they loose collaboration potential in the network.

Next to the acceptance of standards, standards are being assessed with respect to their geopolitical reach. By this, standard adopters determine if a standard is being accepted on a local, regional, and worldwide level. Despite the longterm research on IS standards, there is still a lack in agreeing upon models and rules on the term standard and standardization and therefore the measure of acceptance (cf. de Vries (2002); Krechmer (2007), p. 5). With respect to the characteristics of standards that are applicable by participating actors in export and customs management, Raus et al. (2008,

2009) identified the following characteristics: worldwide acceptance of the published standard, the engagement of international experts, a wide adoption of the standard, and the standard is offered free-of-charge.

Many of the standards that are being issued by the following SDOs are recognized among worldwide accepted standards: the International Organization for Standardization (ISO) (ISO (2009b)), World Wide Web Consortium (W3C) (W3C (2009b)), United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) (UN/CEFACT (2009)), and the Organization for the Advancement of Structured Information Standards (OASIS) (OASIS (2009)). The term standard that is applied by the above-introduced SDOs is now further assessed. At ISO, a standard is a document that is "established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics" (ISO (2004), p. 12). In case the standard is not being accepted by an actor, the adoption of an ISO standard takes place on a local level. Thus, ISO standards are voluntary. "As a non-governmental organization, ISO has no legal authority to enforce the implementation of its standards. ISO does not regulate or legislate" the enforcement of a standard (ISO (2009a)), p. 1). Among 16.500 published standards, an additional 1250 standards are published every year by ISO. IT related standards are covered in dedicated work groups ISO TC 154, ISO/IEC JTC1 and ISO TC 68. W3C pursues and develops web standards and guidelines. Founded in 1994 as an industry consortium, W3C defines a standard as a "a set of language or protocol rules serving as a rallying point, as a base for independent agents to communicate together without a specific and a priori agreement" (W3C (2009a), p. 4). W3C members range from individuals, software and technology vendors, service and content providers, corporate users, research laboratories, standards bodies, to governments. OASIS encompasses technical and XML based e-business standards. OASIS claims its standards to be open and not-for-profit, and accessible to the global information society in form of web services (cf. OASIS (2009), p. 1). Unlike ISO and W3C, OASIS does not detail addressees of standards and fields of application. UN/CEFACT became initiated by the United Nations Economic Commission for Europe (UNECE). Established in the mid of 1960s under the name of UN/ECE Working Party 4 on Facilitation of International Trade Procedures (cf. UNECE (1996)), it became known for developing and maintaining the UN/EDIFACT standards. Since 1995, UN/CEFACT has focused on the facilitation of national and international transactions through harmonized and simplified processes, procedures, and information flows based on business logic and semantic. Standards are defined as "a technical or business specification, established by consensus within the Forum and approved by the Plenary, that provides, for common and repeated use, rules, guidelines or characteristics for

activities or their results, aimed at the achievement of the optimum degree of order in the context of trade facilitation or electronic business" (UNECE (2005a), p. 7).

Any of the above-introduced SDOs established ground rules for the definition and build of standards in their fields of operation. These might differ and being localized differently. Still, the mission of any of the acting SDOs concerns the development and publication of open standards. Herein, the commonly applied standard definition is the following: standards are open, voluntary, worldwide accessible and not limited to a particular organization or industry. The standard development is quality assured and based on a structured and systematic standard development process. Besides the above-outlined definition of standards as proposed by W3C, ISO, OASIS, and UN/CEFACT, more refined definitions of IS standards are proposed. One definition is as follows: "standards represent common agreements that enable information transfer, directly" (Krechmer (2006), p. 44). A more refined one results from taking into account the relevance of the purpose of a standard and the aspect of timing (de Vries (1999), p. 15): a standard is an „approved specification of a limited set of solutions to actual or potential matching problems, prepared for the benefits of the party or parties involved, balancing their needs, and intended and expected to be used repeatedly or continuously, during a certain period, by a substantial number of the parties for whom they are meant".

The introduced classification possibilities of standards revealed distinct viewpoints on IS standards. These are for example based on the subject matter, on the chosen process of developing and issuing a standard, and on the intended use of the discussed standard (cf. de Vries (2006), p. 79). A single valid classification schema is not possible. The discussed viewpoints however provide an overview of attributes and point to useful research.

5.4 From Compatibility to IS Standards

IS standards research benefited from research in the field of product development. Sustainment in the market was highly linked with the achievement of making compatible products (cf. Shapiro & Varian (1999b), p. 27-29). Studies that viewed product compatibility from different angles included studies on supplemental innovative attributes (Farrell & Saloner (1985)), on adapters (Chakrabarti, Alfaro, Henzinger, Jurdzinski, & Mang (2002)), and on systems (Buxmann, Weitzel, & König (1999)). Shapiro and Varian (1999a, p. 8) asked for winning tactics in battles between competing standards and derived conclusions for learning in the IT age (cf. Shapiro & Varian

(1999a), p. 295-296). Resulting in market characteristics and conditions, the ability to choreograph markets (Shapiro & Varian (1999a)), product innovation (Katz & Shapiro (1994)), and compatibility (cf. Saloner (1985), p. 226) the ability was critical to decide upon market entry and the ability to overcome the synchronization dilemma of multiple standards (cf. Tassey (2000), p 588-590). Compatibility efforts did not necessarily cause subsequent effects in inter-operational activities. Intra-organizational agreements were still required to adjust sourcing and production strategies in the supply chain. At market and interaction level, market participants and collaboration partners assented to consider compatible product offerings. Table 5.1 below summarizes compatibility effects.

Table 5.1: Compatibility affecting products, markets, and interactions

Product effects	Markets effects	Interaction effects
Enhances existing products Triggers adapter and system development Influences innovation strategies and variety Influences sourcing and production strategies Affects production and sourcing costs	Creates demand Expands installed base Expands markets Influences vertical and horizontal compatibility needs Affects go-to-market costs	Develops, influences, and optimizes interactions Stimulates competition Stimulates collaboration Changes information quality Affects interaction costs

It is assumed that standards cause similar effects of compatibility on market and interaction level as the effect standards caused by enabling product compatibility. The number and scope of use cases presented below underpin researchers' interest in that field (Table 5.2). Table 5.2 differentiates use cases by product, market, and interaction effects.

Table 5.2: Effects of standardization on markets and interactions

Standardization effects	Use cases in related work that cover IT standardization effects	Observed impact	Source
Product enhancements	Enhanced offering of spreadsheet software	Product compatibility leads to complementary network externalities	Gandal (1995)
	Diffusion of BITNET nodes		Gurbaxani (1990)
	Product characteristics of ATMs (ATM)		Hannan and McDowell (1984)
	Innovative product development	Product reaches higher quality through compatibility and becomes easier adopted than incompatible products	Chau and Tam (1997)
Market and interaction effects	Effects of installed base and geographical locations to diffuse ATMs	Offering of standardized services is a competitive advantage to adopters	Saloner and Shepard (1995)
	Installed base influences buying decision	Larger networks attract more users than small networks	Brynjolfsson and Kemerer (1996)
	Compatibility stimulates market demand	Compatibility attracts users in large networks easier than in small networks	Kauffmann, McAndrews, and Wang (2000)
	Market expansion by using XML-based standards	Reduced integration costs	Wigand et al. (2005)
	Dynamics in market participation caused by vertical standards	Ease of integration for small and medium-sized enterprises Information of the standard is required to become early adopted	Zhu et al. (2006)
	Market expansion, phenomenon of trust, and cost drivers	The credibility of a standard can be increased if actors and even competitors form public alliances	Cockburn (2006)

As illustrated in Table 5.2, researchers used product-based examples in business-to-consumer scenarios to investigate in standards effects. The scenarios were mainly B2B driven. Despite the analysis of IT standards, a dedicated focus on IS standards is missing. B2G scenarios are not apparent in the use cases. From an analytical perspective, researchers did not apply specific collaboration models or stakeholder analysis techniques.

5.5 Network and other Effects of Open IS Standards

Network effects build on the circumstances of how standards affect a single business partner in a network (cf. Katz & Shapiro (1986), p. 825-826; (1994), p. 101-102). Following Varian's categories, standards ease to integrate, collaborate, negotiate, nurture, and commoditize (cf. Varian (2001), p. 41). Further effects derive from economic arguments that trigger the decision of business partners to join a network because of reducing the effort to identify adequate business partners. Once having identified one partner, the integration of the business partner eases with the consensus about the technical and functional intersections between these two partners. Accordingly, the effect is expected with more than one partner joining an organization's network. Partners then expect reduced efforts in doing business with their collaborators. In this sense, the network effect implies a financial benefit namely to diminish integration-related development and delivery efforts (cf. Buxmann et al. (1999), p. 137). However, the use of a standard carries the risk for partners to become locked-in in case the standard restricts organizations or hampers further business activities with new collaborators. Another risk concerns the phenomenon of excess inertia that circumscribes the resistance of an organization to switch to another positively perceived standard awaiting the competitor or another organization to switch first.

Studies confirmed a positive correlation between the standard offered and the increased use of the standard by network participants (cf. Buxmann (2004), p. 3; Katz & Shapiro (1985), p. 424-426). The installed base is a variable that refers to the number of users that installed a standard or product. Though applicable for other users, the installed base steers the potential and sustainability of standards. The installed base bears in mind previous application and standard implementation experience (cf. Chau & Tam (1997), p. 7-8). By this, technical and organizational legacy of implementation efforts influence a user's decision to migrate to an open standard or not (cf. Jain & Zhao (2003), p. 217). The theoretical argument about past influence is known as path dependence. It was introduced by (Liebowitz & Margolis (1995)) and further elaborated by (Puffert (2003)). Organizations that experienced positive effects in the previous adoption of a standard expect further positive effects through the migration to another standard (cf. Zhu et al. (2006, p. 523-524). Liebowitz and Margolis referred to that effect as "first-degree path dependence" (Liebowitz & Margolis (1995), p. 207). Recalling an organizations' sensitivity to past events, an organization studies any possible migration and investment scenarios to better evaluate the operational and financial impact (cf. Nelson & Shaw (2006), p. 283-285). Organizations that experienced proprietary software implementations as limiting or cost intense hesitated to organize standardized

entry points to collaborating partners. Those actors perceive the benefit of open standards as high.

Above-outlined effects do not necessarily differ in network types such as B2B or B2G networks. In B2B scenarios, economic effects are argued with price effects, transaction cost reduction, sales potential and competitive advantage. In this context, three of other transaction-related cost types, connectivity, coordination, and control, have been identified that influence economic effects (cf. Legner & Lebreton (2007), p. 182). These effects were studied by (Cockburn (2006); Katz & Shapiro (1994); Lecraw (1984); Reimers & Li (2005); Gandal (2002)). Prevailing economic effects under the lens of open standards, standard development and deployment costs still occur and costs apply in B2G scenarios. Costs refer to direct and indirect costs involved (cf. Buxmann et al. (1999), p. 4-6). Direct costs are linked to the standard development process itself. Regardless of governmental or non-governmental actor types, indirect costs relate to any organization's individual need and budget to conduct knowledge transfer, training, and migration. Migration costs add to an organization's investment. On the other hand, standards ease the integration of heterogeneous information technology platforms. Pre-requisites are the accessibility and re-usability of the standard's specification and artifact. Once transformed into a public good, the costs of open standards diminish further (cf. David (2000), p. 29). Besides an economic driven discourse of standard usage in B2G, collaborators will normatively associate a standard with gained value and compliance (cf. Lecraw (1984), p. 509). Research argues that B2G collaborators expect a standard to foster market entry (cf. Varian (2001), p. 41-43) and herein lower network access costs (cf. Chen & Hitt (2005), p. 14-15). Still, operational, procedural, and market-mediating efforts apply (cf. Varian (2001), p. 41-43).

Fricke et al. (2006) point out further observations on influencing factors of standard adoption in networks. The study investigates factors that fade out positive effects of standards. Herein, it concerns the role of SDOs in standard adoption research. Because of the growing number of SDOs over the past decades, standard adoption accelerated. SDOs in general were founded on emerging needs of industry focused networks to achieve interoperable and deployable solutions for data, messaging, and inter-organizational standardization needs by industry (cf. Jain & Zhao (2003), p. 211-212). Though SDOs eased the pace of inter-organizational collaboration, the number of competing standards, lacking common semantics and standards life cycle management diminish the impact of standards effects (cf. Lyytinen & King (2006), p. 405). Vanishing effects occur if SDOs do not execute upon their standard offering to a full extent and users perceive negative outcomes. In accordance with (Fricke et al. (2006))

organizations sense implementation burden due to training and adjusting internal procedures and processes, and experience higher efforts in collaboration management. Operational burden increases and slows down organizations in case users are less familiar with implementation projects or observe resistance in executing activities accordingly. Furthermore, competing standards result in higher integration and deployment efforts on the implementation end. Some factors that limit the effect of a standard correspond with research results from (Aberdeen Group (2007); Hamaya (2004); Henriksen (2002); Kindleberger (1983); National Research Council (1995)). Table 5.3 summarizes the limiting factors.

Table 5.3: Factors that limit standards' effects

Causes of lowering positive effects
Access, accreditation, documentation, and implementation costs
Time and resources to deploy a standard
Deployment and training efforts
Missing experience and expertise at internal and business partners
Missing sources of information and skills in standards
Missing standards at business partners
Limited integration of standards at business partners

5.6 Standard Effects on Collaborations

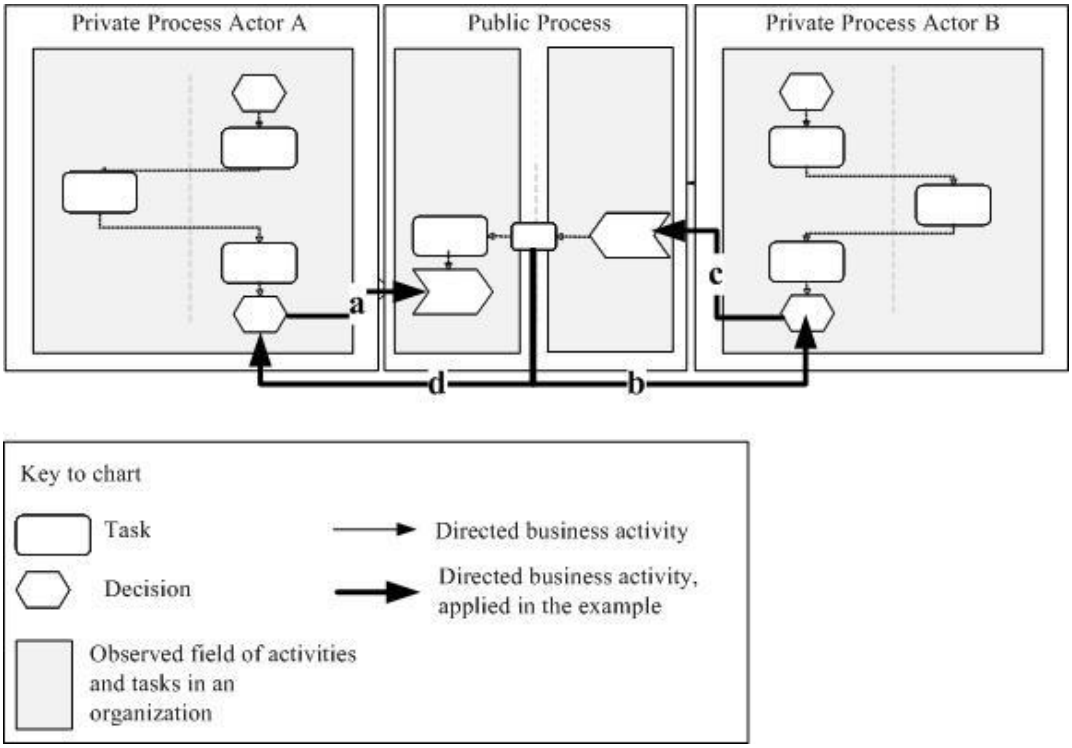
5.6.1 Role of Standardized Processes in Collaborations

The relevance of business processes to standard-enabled collaborations has been studied in the reference framework. Inter-organizational process alignment is also apparent in present IS research with respect to process analysis (Greiner, Legner, Lippe, & Wende (2007)), modeling (Klein, Kupsch, & Scheer (2004); Shen & Liu (2001)), and inter-organizational workflows (van der Aalst & Weske (2001)). From a collaboration point of view, any of the case study specific processes were analyzed by intra- and inter-organizational viewpoints.

According to Carroll, process analysis under the lens of inter-organizational collaboration results in public and private processes (cf. Carroll (1998), p. 2). Public processes are visible and shared among actors. Only those elements are publicly shared that are relevant for collaboration and include roles, tasks, and common means. Publicly made available process elements are covered in industry focused B2B collaboration

research studies (Elvesater, Hahn, Berre, & Neple (2005); Greiner et al. (2007); Roser & Bauer (2007)). Private processes become disclosed when further analysis is needed. Otherwise, they remain suppressed. The logical flow of public and private process elements has been depicted in an inter-organizational research study for the automotive sector issued by (Wende, Vogel, Schemm, Schmidt, Osl, Höning, et al. (2006)). The study applies an analytical approach detailing high-level process analysis, activity-based analysis for each process, and an analysis of workflow items that manage each of the processes.

The following example illustrates the concept of public and private processes in case of two collaborating actors A and B. Actor A is a privately held organization that produces dairy products such as butter and cheese. It issues a health certificate request concerning a cheese product to actor B. B is a governmental actor and represents the departmental unit at a Ministry of Health. Both actors are concerned with their operational activities inside their organizations. The certificate request is a result of a sales order process at actor A. This process has been triggered by the positive response of the warehouse that the products to be sold are available. Three subsequent process steps are then being issued inside A of which the opted transportation route triggers the need of a health certificate (private process a of actor A). The information needed to issue the certificate is being publicly shared with actor B and published by actor A in the public space (intersection of a and c). Actor B receives the notification of the certificate request through shared information from actor A and is then processing the required form and data into his operational activities (private process b of actor B). The certificate is then processed to actor A (public process c) that transfers the information into his operational system (private process d). Thus, each of the organizations shares the process elements that are relevant to the collaboration. Others remain within the organization as depicted in the left and right hand boxes. Figure 5.1 illustrates the concept of public and private processes.



Source: cf. Wende et al. (2006), p. 54.

Figure 5.1: Public-private process views

Organizations that participate in a public process as actors A and B are identified along each of the shared process steps. Organizations transfer information from individual organizations into the network. Public processes are highly associated with the pragmatics level as outlined before. Private processes are subject to intra-organizational operations and are maintained individually. Organizations themselves identify private process information that needs to be digested internally. Through the separation of public-private views, private data is then submitted and transferred into the individual IT landscape of the corresponding organization and feeds appropriate interfaces and applications (cf. Carroll (1998), p. 3-5). Concerning public process management, organizations decide if management specific activities become outsourced to service providers, become collaboratively managed, or remain within a shared-service-center. In case of outsourcing, service providers act as intermediaries. They govern administrative and coordinating tasks on behalf of all participating organizations. A focus on public processes is given in the field of cross-organizational coordination (Greiner et al. (2007); Klein et al. (2004); Legner & Wende (2006); Wende, Vogel, Schemm, Schmidt, Osl, Höning, et al. (2006)). They examined analysis and structure of public processes, and covered roles and responsibilities of actors. Among them, the

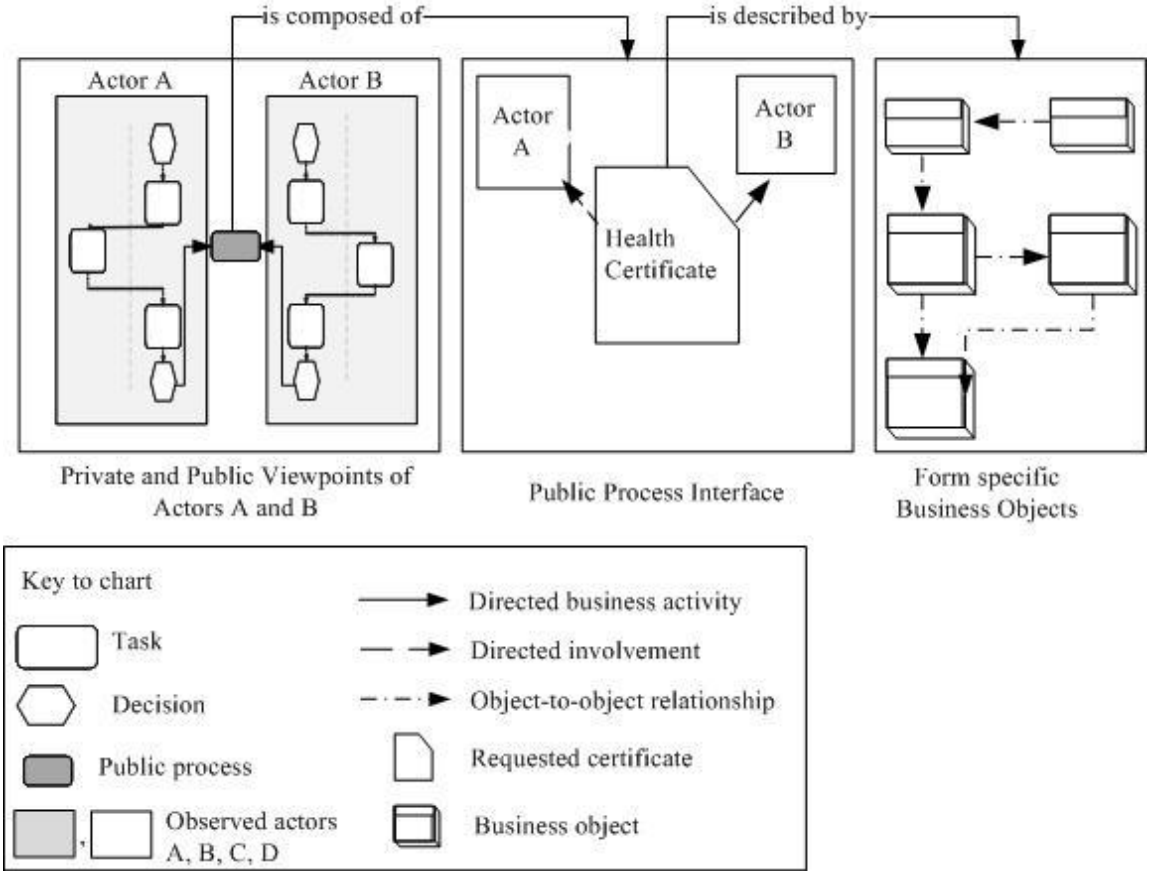
standardization practices supporting public processes were covered by (Wende, Vogel, Schemm, Schmidt, Osl, Höning, et al. (2006)). Based on the latter example, the following activities give orientation on how to identify public process relevant elements. Firstly, collaborating partners gain transparency over the entire cooperation and find an agreement on commonly understood meanings. They define reference processes, tasks, and corresponding roles. Then processes split into public and private processes. Organizations determine intersections between public and private and identify public process interfaces such as commonly used forms and business documents. Within public processes, they distinguish between business objects, organization, and roles. Business objects focus on interdependencies among collaborating business partners and are publicly shared among partners. Organizational and role specific objects define tasks, objects, and responsibilities relevant for each of the organizations. Table 5.4 lists the elements that have been identified so far in the analysis of a public viewpoint on business processes and describes them.

Table 5.4: Elements to analyze public processes

Elements in the public process analysis	Description of the elements
Public-private viewpoint analysis	The analysis concerns process elements that are publicly visible and shared among actors. The analysis includes the intersections of public elements to the private, intra-organizational process elements.
Determination of roles	Herein, the activity concerns the analysis of roles that are required firstly to identify and describe public process elements and secondly to maintain the description of public process elements.
Analysis of commonly shared tasks	This activity concerns the analysis and description of tasks that are needed to collaborate.
Determination of how public processes are being submitted to the actors	Herein, the provision of public processes concerns the question how public processes are being made accessible to the actors. Actors decide upon the further management of public processes.

In the concept of public processes, processes or elements of processes are being shared among collaboration partners. So do roles, tasks, and information. Concerning sharing of information, the institutional role of standards is associated with the role of becoming a carrier of that information (cf. Scott (2001), p. 77-78). They serve as carrier by disclosing characteristics of products (cf. Lecraw (1984), p. 509) and forwarding those to collaborating partners (cf. National Research Council (1995), p. 121). In this role, standards ease inter-organizational interaction due to procedural details that are encapsulated within standards. Constructed by public process elements, standards

encapsulate collaboration relevant activities in public processes. In case of B2G collaborations, process analysts seek to synchronize their activities with regulatory requirements for any B2G participant. In the above-described collaboration scenario of actors A and B the standardized format, data structure, and process elements to request, issue, and receive the health certificate is one example where a standardized form functions as a carrier (Figure 5.2). By this, the standard serves to harmonize and arrange the business objects that are needed to describe the certificate and then transports the information back to the actors. Examples of business objects that become standardized are consignor identification number, product identification number, import and export tariffs, product description, production site, and the identification of the veterinary that approves that the produced product in the claimed production site is meeting the health requirements and consumers are not being harmed by the consumption of the product.



Source: cf. Wende et al. (2006), p. 38.

Figure 5.2: B2G based public process scenario

Turning the focus on private process management and the role of IS standards, organizations apply related work from business process management, workflow

management, and business engineering research (cf. Österle (1995); Österle & Blessing (2007); Winter (2003); Wittges (2005)). These research fields approach collaboration research and the effects of standardization from an individual organization's point of view. IS standards are mostly recognized to trigger procedural and organizational change within organizations. The introduction of technological innovation goes hand in hand with the process innovation to observe an organization's performance or change. With the emerging focus on collaborative business and the research findings in externalizing goods and products production, the field of research expanded to include collaborative business forms and to turn the viewpoint on the business partners of the observed organization (cf. Theling & Loos (2004)). Herein one of the key foci is the search for determinants of collaborative process management (cf. Reimers (2003); Reimers & Li (2008); Theling & Loos (2004); Theling, Zwicker, Loos, & Vanderhaeghen (2005)). Another option organizations have is the use of applying references and best practices that result from the abstraction of intra-organizational process analysis. Examples are the Supply Chain Operation Reference Model (SCOR) (cf. Supply-Chain Council (2008)), ARIS that represents a process framework and decomposes cross-departmental functions of an organization (cf. Scheer & Nüttgens (2000), p. 367-368), and ACQRA that is a customer-centric tool with dedicated focus on relationship management processes within an organization (cf. Marcella (2002)). They analyze how internal operations (i.e. cheese production) and external operations (i.e. milk supply chain) affect an organization's interactions with business partners. The analysis of each of the business partners and their relations among each other are put in the rear. ARIS, ACQRA, and SCOR are considered as examples of baseline reference models. They intend to accelerate the process analysis and the fit of the analytical results with the proposition of process designs that are documented in the reference models. Thus, reference models include process documentation, data structures, planning tools, and guidelines to integrate the process assessment in the design and deployment of IS applications. Some providers of reference models as in case of ACQRA consider their offering as standardized in a sense that they offer standardized data structures and process notations that are being referenced to and re-used in other product offerings (cf. Marcella (2002), p. 3).

The utility of reference models has been reflected in a number of case studies. Still, organizations are limited in applying them in case they have a different understanding of terms, wording and process elements. To resolve this, Fleisch suggested the provision for semantics and syntax in collaboration analysis (cf. Fleisch (2001), p. 142). Syntax defines the correct and complete transfer of information. Semantics secures the correct meaning of what needs to be transferred and uses identification, validation and

synchronization functions. Semantics provide common understanding to processes, messages, and services used among organizations (cf. Fleisch (2001), p. 142-143; Legner & Vogel (2008), p. 39). Studies expand the concept of semantics by the correct usage of information as referred to as pragmatics (cf. Reichwald (1993); Schmaltz & Hagenhoff (2003); Weigle, Schwarzer, & Krcmar (1997)). Both semantics and pragmatics layers are supposed to gain higher flexibility in the identification of what needs to be shared and how. It is expected to establish collaboration faster and more efficiently. Processes, messages and other elements are exchanged. Sources of origin remain in the private networks. A major drawback of applying a pragmatics layer results from the concept. It assumes that collaboration partners are known beforehand. Analysts apply the commercial agreement between the partners prior to the analysis and standardization activities (cf. Fleisch (2001), p. 129-131). In case of customs management, customs departments, tax authorities, or certificate providers that collaborate with the importing party are not visible firsthand to the consignor. It requires further investigation if the concept of pragmatics is extendable to this particular scenario.

Overall, the concept of public processes seems a promising approach to assess inter-organizational collaboration needs and concentrate on shared activities, transactions, and data requirements. Similar to the concept of pragmatics, public process analysis and design require an ex ante transparency of who is participating in the collaboration (cf. Legner & Wende (2006), p. 3). The concept of separating public and private views is still under research and seeks empirical evidence**.** One study that applies the set of activities for public and private views evaluates distinct cooperation, respectively coordination and concepts (cf. Wende, Vogel, Schemm, Schmidt, Osl, Höning, et al. (2006)). It studied distinct concepts that include workflow management standard, IS standards (RosettaNet, ebXML), and process definition languages including UN/CEFACT Modeling Methodology (UMM) and Business Process Modeling Notation (BPMN). The study concludes that the concepts are promising and cover most of the demands in semantics. However, none of the examined standards fulfilled the entire set of criteria as requested (ibid., p. 44). Any of the assessed concepts lacks the inclusion of actor types. Furthermore, the concepts direct their use towards B2B collaborations. B2G needs were not covered. Among a number of important questions left open are in which stage of the collaboration formation partners need to agree upon semantics, syntax, and pragmatics.

5.6.2 Determinants of Collaboration Effects in Related Work

Following the interrelatedness of public processes and standards, a detailed analysis of processes is feasible in case network participants share, exchange and conduct common activities (cf. Fomin, Keil, & Lyytinen (2003), p. 31). Assuming that public processes stimulate the collaboration potential of network actors, the interactions among organizations influence the usage and acceptance of standards (cf. Damsgaard & Lyytinen (1994), p. 5; (2001), p. 197; Nelson & Shaw (2005), p. 7). To investigate further determinants that affect collaboration, the present section reflects on related work in that field.

Opening the discourse on standards' role in the IS research in 2003 by (Lyytinen & King (2003)), MIS Quarterly introduced in 2006 a special issue on standards. Three out of seven accepted and forty-six submitted papers were rated as relevant for standard-based collaboration (Lyytinen & King (2006)). Those include (a) one about standards in the U.S. residential mortgage industry introduced by (cf. Markus, Minton et al. (2006), p. 255, 388), (b) a Unified Economic Model of Standard Diffusion presented by (Weitzel, Beimborn, & König (2006)), and (c) migration strategies towards open-standard inter-organizational systems (IOS) presented by (Zhu et al. (2006)). Compared to the publications (a) and (c), publication (b) does not specify collaboration examples or the impact of standards on collaboration. It is therefore not considered for further analysis. Alternatively, a forth paper (d) that outlines collaborative aspects on multiple organizational levels is presented by (Reimers (2003)). Despite the fact that the papers refer to vertical standards and B2B scenarios, insights into the collaboration settings in each of the cases might deduce B2G relevant collaboration characteristics.

Paper (a) refers to the deployment of MISMO standards in the U.S. residential mortgage industry introduced by (Markus, Minton et al. (2006)). Industry specific standards, issued by the Mortgage Industry Standards Maintenance Organization (MISMO) (Mortgage Bankers Association (2008)) are provided in the form of residential and commercial standards. Those define paperless form processing and information security guidelines for secure information exchange. Process wise the mortgage lending process was examined from mortgage application, underwriting processing to servicing. Major outcome of the research refers to the failure of one of the standards, SMART Docs. It secures, manages, archives, retrieves and transfers documents in a pre-defined format made accessible to business partners. The standard was viewed as complex as it holds data redundantly. The file is validated twice, firstly in the process when being generated and issued, secondly when being received.

Paper (c) presented by (Zhu et al. (2006)) is about migrating from proprietary via EDI to open-standard inter-organizational systems (open-standard IOS). They concentrate on technology, syntax, and the differentiation of proprietary and open-standard healthcare applications. Migration to an open-standard IOS is reasoned by financial and labor savings compared to former efforts. Open standards provide data formats (referred to content platform) and the medium to access data (referred to as delivery platform). They foster usability by business experts and do not require detailed technical skills. Negotiation would not be needed prior to starting the collaboration. The diffusion of open standards then depends on the provision of affordable platforms such as the internet and that collaborating partners accept the standard.

The paper (d) presented by (Reimers (2003)) concerns the evolution of electronic commerce in the Chinese market. With respect to supply chain driven collaboration scenarios it addresses the need of cross-organizational linkages, respectively institutional structures. Linkages concern first-order relationships between customers and suppliers and second-order relationships among suppliers. The collaborating partners engage through agreed upon transactions. Compared to public processes transactions contain standardized and logical functionality, functional elements, and documents. Reimers points to the usage of EDI in his example and the limitations of standardization in many-to-many relationships. Despite his argument of conducting standardization on a bilateral basis, his assessment contributes to the present work. The assessment of institutional structures reveals an analytical approach of collaborating actors: an analysis of the institutional structure of observed collaboration is followed by the analysis of types and sizes of organizations participating in the collaboration. Furthermore, the approach looks at the coordination format between suppliers and if they participate in distinct or the same collaboration environment.

Table 5.5 summarizes the above-assessed papers and outlines details, actors, roles, and ties.

Table 5.5: Characteristics of business collaboration

Characteristics	(a) Mortgage Industry in the U.S.	(c) Open-Standard IOS	(d) Vertical collaboration forms in China
Collaboration characteristics			
Observed industry	Mortgage Industry	Health Care industry	Industry not specified
Participating actor types	Home buyers Mortgage brokers and credit agencies Service providers and IT vendors, among others	International organizations from Brazil, China, and others	Suppliers Customers
Participating industries	Public Services Financial services and real estate Software Industry	Manufacturing Retail & Wholesale distribution	Actors within one industry Not specified further
Collaboration forms	Bilateral agreements among trading partners	Alliance building took place among actors	Agreements are driven by actors or yielded to industry associations Collaboration varies by dominant, fragmented, implicit, and explicit industrial structures
Inter-organizational process types	Origination and forms processing Legal property transfer, payments and tax services	Not specified	Transaction processing (for example sales order, accounting information)
Process views	Not specified	Not specified	Shared (public) processes

Table 5.6 concentrates on effects of standards as applied in the discussed papers. It reveals further research impressions that are now further discussed. Concerning the function of inter-organizational collaboration, any of the illustrated contributions stressed the need to find consensus among the participating actors. Actors represent quite distinct organizations and reveal distinct objectives they like to gain from the collaboration. Still a common sense is needed to make the collaboration work. Furthermore, the elements that bind actors together are of different but commonly agreed upon nature. In case of paper a) actors seek the design and use of a network-wide IS standard through a streamlined standard development process. It is then successful if heterogeneous interests do not outperform the common interest and diffusion of the standard succeeds. It is recommended to involve actors and in particular the prospected users in the standard development process. Still, the industry-relevant matters are driving the process of collaboration formation and the decision upon the means that bind actors together.

Table 5.6: Standard effects in selected networks

Characteristics		(a) Mortgage Industry in the U.S.	(c) Open-Standard IOS	(d) Vertical collaboration forms in China
Inter-organizational standards	SDOs	MISMO	W3C, OASIS	UN/EDIFACT
	Issued standards	SMART Docs	XML (SOAP, WSDL)	EDI
	Standard characteristics	Open and voluntary Industry specific	Open and voluntary	ERP specific
	Standard categories	Process standards Data standards: EDI, XML, X12	Internet based, technology	Shared processes to centralize transaction processing Data standards: EDI
	Semantics	Industrial terms and data dictionary	Not specified	Specified in terms of computer-to-computer communication
Standard effects on collaboration	Collaborative aspects	Data, form, and authentication processing improved Actors agree ex ante upon data usage, formats and access rights	Standards facilitate cross-industry collaboration by attracting peers and foster network and economic effects	Data, document, and transaction specific exchange among actors
	Network density	Dependent on collaboration structure	Driven by trading community attributes (size and types of actors) Co-existing standards lower density	Dependent on collaboration structure Driven by shared information, transaction criteria (sales orders i.e.), duration of collaboration High density among competing actors (implicit collaboration) Low density (explicit collaboration)

Where paper a) provides insights in the standard negotiation process in a given industry, paper c) focuses on the adoption of a standard in an industrial environment. It recommends assessing the standard development process for open standards. It opens the discourse on the characteristics of open standards by illustrating the migration paths from EDI and a proprietary standard to an open standard. By this the actors' interest are being assessed and demonstrated that the standard's characteristics, open or proprietary, drive the inclusion of more actors and the degree of complexity in the consensus-seeking process. The paper introduces standards' characteristics and sets them into relation with the effects the standards cause in the network, namely the ratio of compatible products that apply the standard compared to the degree of adoption caused by the peers that use the standard. Furthermore, it outlines the economic impact such as transaction costs that are involved in the migration to an open standard. Herein, the paper points to the dependency of a standard deployed and the operational and procedural activities that are influenced by the standard. If proved useful, the standard steers the business processes that are set in place or required in an organization.

The emphasis of paper d) on the discourse of collaboration stimulators expands the findings from papers a) and c). Based on the use of a standard, namely EDI, the organizations that initiate the collaboration have multiple choices to succeed with the collaboration: horizontal coordination that does not form because of a single dominant market player, vertical coordination that is controlled by a dominant market player or a network that forms loosely and with a low degree of network intensity. Revisiting the role of a dominant market player in a vertical network, its role becomes beneficial once external stimulators are missing. Horizontal collaboration types that are more of the nature of polycentric networks will require an external, institutional stimulator that steers the network initiation, as for example do industry associations or consortia. Concerning the role of standards, horizontal collaboration types tend to centralize the functionality of commonly shared data, processes, or forms. It is expected that centralization facilitate the deployment of semantics and pragmatics among actors that are interacting. Contrary to that, multi-lateral agreements lead to interpretable versions of data, processes, and forms and therefore complicate the tradeoff of applying the standard with more actors. The observations in paper d) however raise the need to give further emphasis in future research on the governance of a centralized approach. One aspect of governance concerns the matter of trust among actors to share those data that need to be centralized and to be made visible. Another aspect relates to the maintenance of multiple memberships of collaborators in distinct networks and how they manage internally for example distinct standardization agreements and data and process requirements.

Concluding this section, all research contributions agree upon the following stimulators of inter-organizational collaboration:

- Seeking consensus to conduct collective action influences positively the collaboration
- Developing and maintaining a common understanding of the operational activities, data, terminology, and use of information that are being shared
- Developing and agreeing upon processes, roles, and responsibilities among collaborating actors,
- Establishing common means and consider the use of an open standard.

The key findings in the above-outlined studies and their transferability to cross-sectoral environments are as follows:

- IS standards usage depends on structural conditions of a network such as network size and installed base, types of stakeholders, as well as mode of interaction resulting in network density.
- IS standards usage requires bilateral agreements among trading partners. Agreements include data usage, formats, and access rights. An ex-ante negotiation is essential.

Concluding the assessment, the papers concentrated on diffusion and adoption phases of standards. Except paper (a) that included a review of MISMO's origin and paper (c) that covers institutional actors, further details on standard development were not discussed.

5.7 Open Standard Development

This section responds to the identified research gap to reveal further details on open standard development (cf. Reimers & Li (2003), p. 268; Zhum, Kraemer, Gurbaxani, & Xu (2006), p. 533). So far, research concentrated on roles and responsibilities of actors involved in standardization from a business actor perspective. Löwer for example provided insights into globally active SDOs such as UN/CEFACT and shed light on the legislature role of governmental actors (Löwer (2005)). The assessment concluded in a comprehensive conceptual framework that covered standard development activities from multiple actors' perspectives: regulators, software vendors, user firms, and SDOs. Still, research on standard development expects more insights into the interactions between governmental institutions and business partners (cf. Damsgaard & Lyytinen

(1994), p. 3-5). Zhu et al. recommend including the institutional view and focus on influencers in standard adoption (cf. Zhu et al. (2006), p. 524). Brunsson and Jacobsson confirm this need in their studies on standards (Brunsson & Jacobsson (2002)). The following paragraphs respond to that demand and details actors involved in standard development and the standard development process as such.

5.7.1 Actors Involved in Standard Development

Standard development is viewed as an act of collective action. A substantial number of players are involved. Their involvement is not limited to development specification or further steps on how to develop and where to publish the standard (cf. Reimers & Li (2005), p. 5-6). Distinct players interact, negotiate and discuss the usage of the standards (Reimers & Li (2005)). Though recent studies covered standard development, the assessment of involved actors was limited (Hamilton & Stiegert (2000); Jain & Zhao (2003); Nelson & Shaw (2005); Mendoza et al. (2005); Reimers & Li (2005); Wigand et al. (2005)). The present section elaborates on actor types and roles and introduces a structured format.

The standards community as introduced in this work unites actors that are directly involved in standardization. Actors are individuals. This dissertation focuses on individuals that act as drivers, standardizers, regulators, implementers, and users. In the following, each group is introduced one by one (Figure 5.3). Drivers initiate standards by interest. Dominant market players might accelerate standardization by investing in de facto standards and easing the development. On the other hand, single-actor interests might cause lock-out effects for competitors, and hamper standardization efforts (cf. Jain & Zhao (2003), p. 214). Businesses and political entities are examples for drivers (cf. Meyer (1996), p. 248).

Standardizers are those entities that do choose to standardize. They offer expert knowledge in the form of guidelines, rules, specifications or procedures to a potential customer base or market (cf. Cockburn (2006), p. 17). They engage with SDOs. Other standardizers are software vendors launching products with a built-in standard. Conflicting situations arise due to differing economic and political agendas where standardizers sense standardization needs differently and apply controversial success measures (cf. Cockburn (2006), 29-32). Though standardization needs might cause conflicting situations among competing participants coordination within and among various standardization committees needs to be performed accordingly. Through the formation of public alliances for example, credibility of standardizers increases.

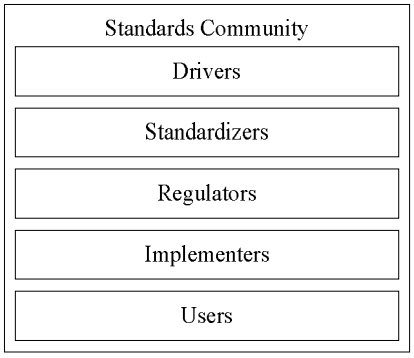


Figure 5.3: Actors involved in standardization

Regulation as sensed in this work is the act of rule making that elicits standard development. Rule making is seen as organized governance where regulators such as political entities and standardization organizations are involved (cf. Brunsson & Jacobsson (2002), p. 26-28). Regulators accordingly are in charge of rule making. Implementers are referred to as those actors that deploy the standard for example by incorporating it in application design or offering consulting services. This type of implementer is often found in business organizations, consulting companies, but also in political entities and governmental authorities. They benefit to a certain extent from network effects to multiply the offering to a larger community. Revenue effects result from deployment investments that users make to deploy standards. Users in this context represent the group of customers, software providers and individuals that apply standards in various forms like software, a product, or any combination of these. It is expected that users route back experience, updates and knowledge to the standards community (cf. Jain & Zhao (2003), p. 219). The following example from a governmental perspective provides details into organizational instances and international interrelatedness of governmental actors (Department of Commerce of the United States of America (2004)). In the example of the U.S. Government, the interrelatedness looks like the following (Figures 5.4 and 5.5). On the national level, individual agencies and the National Institute of Standards and Technology (NIST) cover standardization needs.

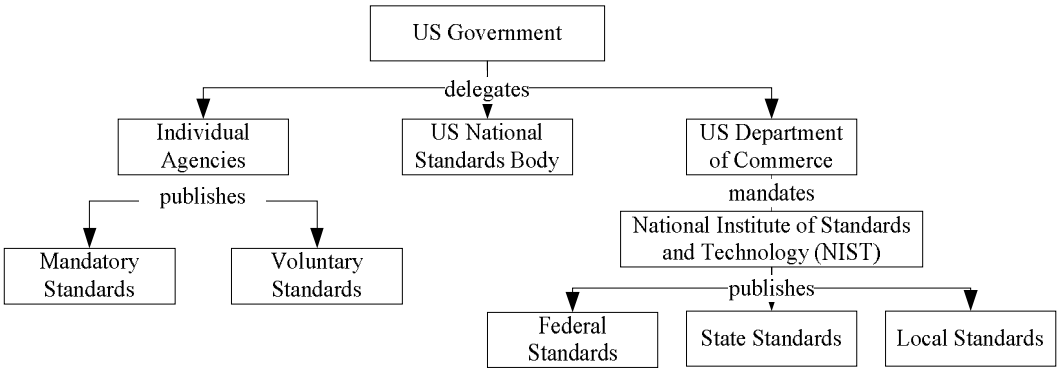


Figure 5.4: Interaction of governmental institutions in local contexts

On the national level, the US Government delegates tasks concerning the design and issue of policy objectives and activities to individual agencies (cf. Department of Commerce of the United States of America (2004), p. 5). Agencies then publish standards, mostly voluntary standards. In selected cases, they develop mandatory standards that become part of regulations. Standards in this case refer to best practices such as the Code of Good Practice in the World Trade Organization agreement (cf. WTO (1986-1994), p. 120-121). With respect to commerce related standards, the U.S. Department of Commerce relies on NIST. NIST employs about 400 specialists in more than one hundred SDOs to ensure regulation compliance and supervise standards. Issue of standards is then subject to local, state, and federal institutions. Standards related information is made available under (NIST (2005, 2008)). If needed, NIST develops standards.

On the international level, national governments such as the US Government participate in standardization through various different actors (cf. Department of Commerce of the United States of America (2004), p. 6-7). Four major organizational setups are possible (Figure 5.5): private voluntary organizations (1), treaty organizations (2), professional and technical organizations (3) and company or industry-based consortia (4).

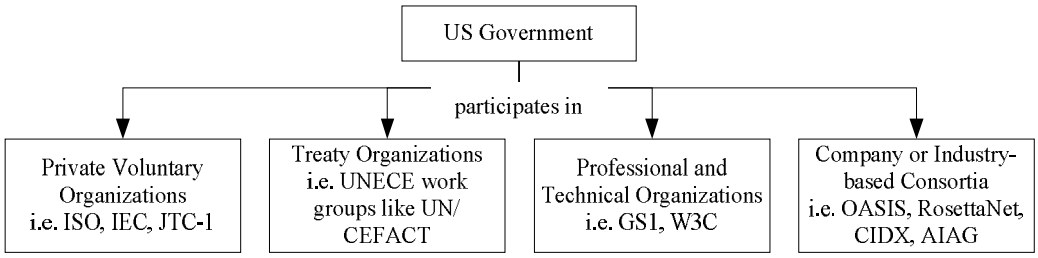


Figure 5.5: Interactions of national governments with standardization organizations

Nations are represented in private voluntary organizations (1) through nominating delegates to organizations like ISO, IEC, and ISO/IEC. ISO and IEC jointly develop IS standards through a Joint Technical Committee (JTC1). One example of JTC1 standards relates to learning, education and training standards under subcommittee SC36. SC36 agrees upon common vocabulary and collaborative technology as well as international standardized learning profiles. It embraces interoperability and reusability of resources and tools. Governments nominate individuals as delegates for treaty organizations (2). Delegates act on behalf of governments and nations. Among treaty organizations are UN/CEFACT and other working groups of the United Nations Economic Commission for Europe (UNECE). UNECE's mandate is to accommodate globally governmental and business partners in electronic commerce and trade activities. Professional and technical organizations (3) cooperate in organizations such as GS1 and W3C. GS1 is a global standards organization, formerly known as EAN International and Uniform Code Council.

Referring to (3), the European Committee for Standardization Organizations (CEN) (CEN (2009)) cooperates for example with U.S. American standards bodies and trade associations that seek business opportunities with European Member States for example. CEN drives consensus among economic partners that participate on a voluntary basis. CEN cooperates closely with ISO, UNECE (UN/CEFACT), and IEC. Within the Enterprise Interoperability Roadmap, CEN researches on business and technical standards among other topics (CEN/ISSS (2006), p. 4). Consortia (4) are standardizers whose membership is mainly company or industry-based. Among them are RosettaNet (RosettaNet (2009)), AIAG (AIAG (2009)), and OASIS. OASIS offers for example workshops, consultations, advising sessions, including consultations for regulations. Referring to trade regulations, OASIS facilitates the standard development process for organizations to meet obligations under the WTO agreement.

Referring back to actor types that do choose to standardize, the following organizational settings of standardizers have been identified: individual agencies on national level, national standards bodies, private voluntary organizations, treaty organizations, professional and technical organizations, and company and / or industry-based consortia.

5.7.2 Open Standard Development at UN/CEFACT

This section illustrates a standard development process based on the example of the Open Standard Development Process (ODP) at UN/CEFACT. The result of any ODP is

a published standard. UN/CEFACT subsumes under a published standard specifications, recommendations, and user guides. A business standard released by UN/CEFACT is open and voluntary. Under tracking number TRADE/R.650/Revision 4/Addition 1, actual ODP proposals are made available to the public (UN/CEFACT (2007)). The ODP consists of procedural activities. These describe which actors are required for which standard development and publication activity. The ODP consists of the following steps (Table 5.7).

Table 5.7: Open Development Process at UN/CEFACT

Open Development Process (ODP) Steps
ODP1: Project Proposal and Team Formation
ODP2: Business Requirements Specifications Development
ODP3: Internal Draft Development
ODP4: Internal Business Requirements Specification Review
ODP5: Public Business Requirements Specification Review
ODP6: Implementation Verification
ODP7: Publication
ODP8: Maintenance

Actors that participate in the OPD are drivers and standardizers as well as reviewers. A standard reaches publication stage after successful completion of ODP7. UN/CEFACT makes it accessible online and free-of-charge for actors such as implementers, users, and governmental organizations. No specific timing or scheduling is necessary to initiate an ODP. Once publication stage is reached in ODP7, standardizers anticipate immediate implementation and deployment activities of organizations (ODP8). A detailed outline of each of the activities in ODP1 to ODP8 is described in Table A.9.6 (see **Table A.9.6**). Based on the organizational settings, Table 5.8 cross-references actors to the ODP steps of UN/CEFACT.

Table 5.8: Actors involved in ODP

ODP Steps	Organizational settings in the ODP
ODP1: Project Proposal and Team Formation	Drivers
ODP2: Business Requirements Specifications Development	Standardizers
ODP3: Internal Draft Development	Standardizers
ODP4: Internal Business Requirements Specification Review	Standardizers
ODP5: Public Business Requirements Specification Review	Subscribers, experts, national heads of delegations, and regulators
ODP6: Implementation Verification	Subscribers, experts, national heads of delegations, and regulators
ODP7: Publication	Standardizers
ODP8: Maintenance	Implementers, users

The reflection on the organizational setup of UN/CEFACT reveals intra-organizational and cross-vertical collaboration streams with other SDOs (Figure 5.6). UN/CEFACT is comprised of five permanent groups that work on legal (LG), technical (TMG), trade and business process related (TBG), and methodological (ATG) activities. As a treaty organization, UN/CEFACT exists through voluntary contribution. Interactions with other SDOs take place in trade and business process related subgroups (sub-TBGs). Vertical SDOs like AIAG, ACORD, or CIDX send out delegates to cooperate with UN/CEFACT. They issue industry specific requirements and provide terminology, semantics, and vertical amendments to be considered in the ODP.

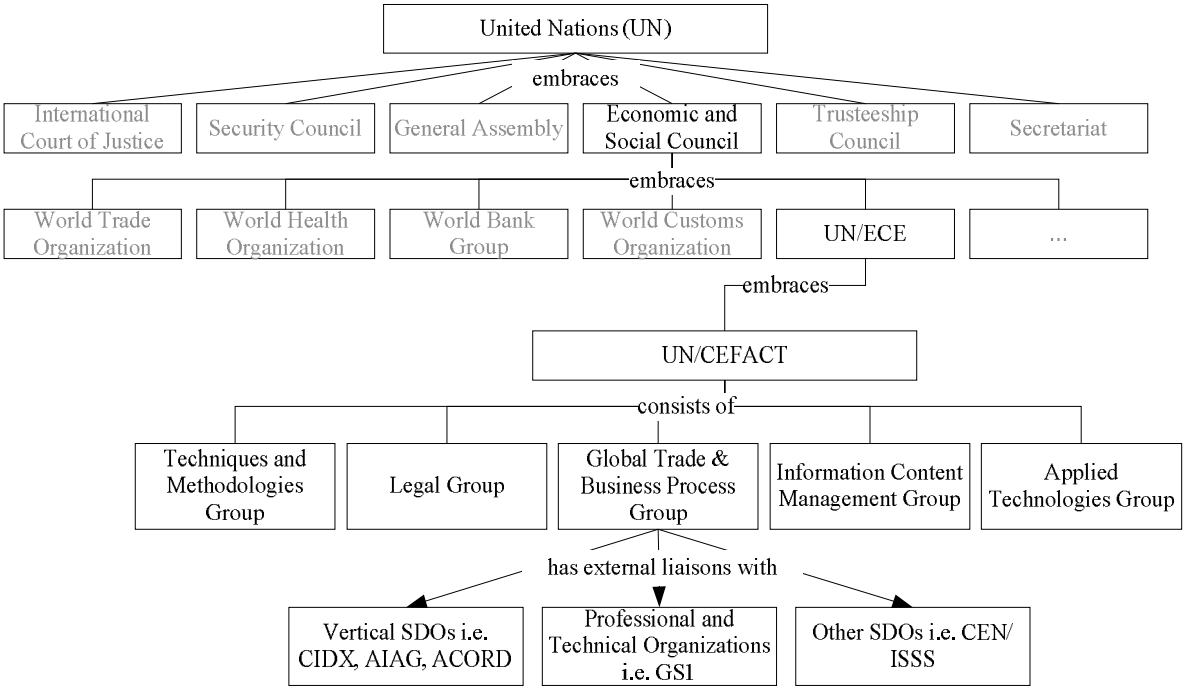


Figure 5.6: Organizational chart of UN/CEFACT and external liaisons

Next to the ODP, governmental actors apply conformity assessments to ensure quality and compatibility of a standard. Prior to the market launch, a series of activities ensures that a standard meets quality measures. Those refer to sampling, software conformance testing, evaluation, system based verification, and accreditation of suppliers. Conformity of standardization finds little entry in IS research so far (cf. Commins (2004), p. 10-11; Lyytinen & Fomin (2002), p. 168). The concept is mainly known through practical use in the U.S. American Department of Commerce (Department of Commerce of the United States of America (2004)), and NIST (Tassey (2000)) and the study on standard adoption in developing countries (cf. Stephenson (1997), p. 92). In both cases, conformity assessments are realized by various means. Those focus on arrangements among certifying bodies to develop, accept, and diffuse conformity results to local and international users and regulators. Ideally, conformity relevant test mechanisms and procedures contribute to standard development and help to ensure global acceptance. Actors in standard development however should check limitations of conformity assessments. Nationally accepted procedures do not necessarily convey to international use cases and internationally accepted procedures do not necessarily meet local requirements.

5.8 Summary

This chapter provided the reader with the basic concepts of standards, standard types, building blocks, and effects that standards cause in organizations and networks. The chapter further discussed network effects of standards as observed in related work. The most relevant insights from this chapter are as follows:

- The attempt to classify IS standards revealed the need to consider distinct viewpoints on IS standards. Main viewpoints result from the expectations of creators, implementers, and users of a standard. Hereby, the definition of standards is as diverse as the attributes that could be taken into account. A comprehensive definition has been provided by de Vries and takes into account the relevance of the purpose of a standard and the aspect of timing (de Vries (1999), p. 15): a standard is an „approved specification of a limited set of solutions to actual or potential matching problems, prepared for the benefits of the party or parties involved, balancing their needs, and intended and expected to be used repeatedly or continuously, during a certain period, by a substantial number of the parties for whom they are meant“. Categories that are relevant to assess IS standards concern the origin of a standard, the field of application, and the openness of standards. Concerning the origin of a standard, legally imposed standards are referred to as governmental standards (cf. de Vries (2006), p. 11). If not legally imposed but formally sealed, standards are referred to de jure standards. Driven by the assertiveness of a standard's provider to initiate, deploy, and mandate a standard in the market, a standard classifies for de facto. Further distinction is made by the application of the standard as being voluntarily used or become mandatory. A mandatory standard is legally binding thus enforced by law. To use a voluntary standard is the choice of the individual user, organization, market, or network. However, in the case of a dominant market player, that incorporates the standard, the collaboration network and consumers find it hard or even impossible to refuse the standard's use. A further distinction is made by assessing the openness of a standard. Originated in the concept of compatibility, openness could express the technical capability of a product or system to connect to another product or system. An open standard perceives to be accessible by vendors and other parties with no entrance fee or charges are involved. A more refined categorization of open reveals the need to differentiate the viewpoints by creators, implementers, and users. Hereby, Krechmer proposes open to be referable to open meeting, consensus, due process, open world, open intellectual property rights, open change, open documents, open interface(s), open use, and ongoing support (cf. Krechmer (2006), p. 48). Next to the origin, application, and openness of a standard, the geopolitical reach of a standard determines its use, applicability, and diffusion of

a standard. IS standards facilitate sectoral, cross-sectoral, and inter-organizational exchange of processes, messages and documents for collaborative and repeated use. As one solely classification schema is not useful, research in IS standards should consider the subject matter, the chosen process of developing and issuing a standard, and the intended use of the discussed standard (cf. de Vries (2006), p. 79).

- The field of IS standards research evolved through research in the effects of compatibility on products, services, and systems. Recognized as supplemental innovative attribute, compatibility was primarily researched on adapters and systems. The interest in compatibility from an information systems point of view emerged through the focus on product-centric towards organization-wide to market-centric effects of standardized systems. IS research used product-based examples in business-to-consumer scenarios to investigate standards effects. The scenarios were mainly B2B driven. So far, B2G scenarios are not apparent in the use cases. With the dedicated focus on networks in this dissertation, research on EDI helped to pace the research on inter-organizational collaboration mechanisms. EDI itself is perceived as an open, voluntary standard that belong to the category of IS standards for inter-organizational collaboration. Still, the question of financial implications on a standard's use as well as the technical and organizational legacy of implementation efforts influence the decision of network participants to implement a standard or migrate to another standard.

- Findings in the field of standards' use in a B2B driven environment relate to the economic value of service and product offerings, transaction and sales efforts, and the competitive advantage of an organization. In B2B environments, costs occur and are taken into account to justify the implementation of a standard. Costs relate to connectivity, coordination, and control. A further distinction in direct and indirect costs refers to direct costs that relate to the standard development process. Indirect costs relate to any organization's individual need and budget for knowledge transfer, training, and migration for example. With respect to B2G collaborations, standards account for a perceived value of the standard and a reduction in standard adoption and maintenance costs. However, the economic value of standards in B2G so far has not been analyzed. The growing number of SDOs and therefore increased offering of standardized elements raises the concern that B2B and B2G networks and individual organizations become swamped with overlapping and opposing elements. The scope of economics in B2G collaborations is beyond the scope of this work. It is recommended to study this field further.

- Network effects build on the circumstances of how standards affect a single business partner in a network (cf. Katz & Shapiro (1986), p. 825-826; (1994), p. 101-102). Further effects trigger the decision of business partners to join a network because of reducing the effort to identify adequate business partners. Once having identified one partner, the integration of the business partner eases with the consensus about the technical and functional intersections between these two partners. Accordingly, the effect is expected with more than one partner joining an organization's network. The effect of a standard could be observed from two viewpoints, private and public. Private processes are defined as intra-organizational processes. Once become relevant to the external collaboration, processes become public thus inter-organizational. The relevance of public process analysis in IS standardization raises the question of including public process elements into IS standardization activities or not. This work claims that public process elements are relevant and become critical to denote the scope of an open standard not only from a technical, infrastructural aspect but also from an inter-organizational management aspect. Standards become a means to encapsulate collaboration relevant activities in public processes. Further analysis is required to investigate the potential fit of regulatory requirements that affect any B2G participant to the public process elements that affect as well any B2G participant.

- The dissertation reflects on three networks that were subject to related work and provide insights into the collaboration formation, role of standards, and effects standards caused or hampered in the observed networks. A schema has been proposed to compare networks. The schema covers the following criteria: observed industry, participating actor types and industries, collaboration forms, inter-organizational process types, process views, applied standards, standard characteristics and categories, use of semantics, and effects of standards on the collaboration and network density. The comparison concluded two aspects. Firstly, IS standards usage depends on structural conditions of a network such as network size and installed base, types of stakeholders, as well as mode of interaction resulting in network density. Secondly, IS standards usage requires bilateral agreements among trading partners. Agreements include data usage, formats, and access rights. An ex-ante negotiation is essential.

- Related work and the observed cases revealed the need to include the study of a standard development process based on the example of standards issued by the US Government. It reveals actors and actor types. The standard development process is illustrated based on the example of the Open Development Process of UN/CEFACT.

6 1st Round of Design of the B2G Procedure Model (B2GPM)

6.1 Introduction into B2G collaboration

This and the following chapter introduce a procedure model to institutionalize B2G collaborations for customs. The procedure model is called B2G Procedure Model (henceforth B2GPM). The procedure model concerns customs management activities excluding the financial implications for and financial obligations of participating actors. Key findings from the previous chapters and related work provide the conditional frame to assess B2G relevant elements (Table 6.1). The multi-dimensional characteristic of B2G collaborations revealed a number of building blocks that form B2G collaboration. Among them, standards find an entry as institutional medium (cf. Scott (2008), p. 81). Further characteristics of B2G collaboration are as follows. Regulatory and procedural aspects concern any participants. Following the concept of Brass (cf. Brass (1995), p.3), actors appear in same- and cross-level interactions. Brass clusters actors based on their roles they perform in the collaboration (see **Table 4.2**). Access to markets is not limited to actor types. Actor types that control access to markets and collaborations are not apparent in B2G collaborations. Access requires regulatory conditions that facilitate actors. Standards and their contribution to B2G collaborations come into view in expectations framed by observed actors and as indicated in regulations such as the Modernized Customs. Their potential role as institutional component is part of the proposed procedure model.

Table 6.1: Conditions for successfully internalized B2G in customs

(a) Actors have unlimited access to collaboration regardless of geographical spread and industrial focus of actors and networks
(b) IS applications facilitate collaboration
(c) Transactions are export based
(d) Regulations bind actors together including governance and compliance control functions
(e) Collaborating networks are transferable to other export markets and networks
(f) Collaborating networks require standards
(g) Standardized procedures and data models are accessible to any collaborating actor

One prerequisite to clarify the role of standards and derive the B2GPM for standardized B2G is an agreement on those elements that form B2G collaboration. The first phase covers governmental and non-governmental actors (Section 6.2). The second phase reveals institutional factors relevant for B2G (Section 6.3). It builds upon institutional

analysis proposed by Scott. The next phase assembles elements and puts regulatory environments and modes of coordination and access into context. It results in a procedure model for B2G (Section 6.4).

6.1.1 Additional Sources of Information

To serve triangulation needs, further secondary data of regulatory and supplementing material is added. Table 6.4 lists any source that is subject to the analytical and modeling part in this work. The selection focuses on material relevant for EU member states, the European Community, and the USA. The selection is based on trade shares in the sense that the US is the largest export partner of the 27 EU member states (Table 6.2) (DG Trade (2007), p. 2) and it is the second largest import partner of the EU member states (Table 6.3) (cf. DG Trade (2007), p. 2). In addition, the EU member states, the European Customs Union, and the US Government represent 29 out of 174 WCO members (WCO (2009)). Each of the 29 WCO members transposes inter-governmental conventions into national legislation differently. Thus, selected members provide insights into regulatory impact and modeling constraints for the B2G Procedure Model.

Table 6.2: Major export partners of the EU Community in 2007

Source: DG Trade (2007), p. 2.

Rank	Export partners	Mio. Euro	%
	World	1.239.873	100,0
1	USA	261.634	21,1
2	Switzerland	92.747	7,5
3	Russia	89.125	7,2
4	China	71.791	5,8
5	Turkey	52.611	4,2

Table 6.3: Major import partners of the EU Community in 2007

Source: DG Trade (2007), p. 2.

Rank	Import partners	Mio. Euro	%
	World	1.425.525	100,0
1	China	231.411	16,2
2	USA	181.176	12,7
3	Russia	143.587	10,1
4	Japan	78.103	5,5
5	Switzerland	76.768	5,4

Table 6.4: Applied sources of legislation and supplementing material

Prime sources of legislation and second sources	Reference type[3]	Geographical applicability	Issuing party	Receiving party
US Law "Implementing Recommendations of the United States 9/11 Commission Act of 2007" (govtrack.us (2007)) covering Advance Democratic Values, Address Nondemocratic Countries, and Enhance Democracy Act of 2007 Federal Agency Data Mining Reporting Act of 2007 Improving Emergency Communications Act of 2007 National Transit Systems Security Act of 2007 Secure Travel and Counterterrorism Partnership Act of 2007	Legislation	National	Governmental agencies	National and import partners
C-TPAT US Customs-Trade Partnership Against Terrorism (U.S. Department of Homeland Security (2001))	Legislation	National	Governmental agencies	National and import partners
European Community Treaty "Article 133 Committee" (European Commission (2009))	Legislation	Supranational	Governmental agencies	EU Member States
Lisbon agenda (European Commission (2005b))	Legislation	Supranational	Governmental agencies	EU Member States
Electronic Customs Decision (European Commission (2008))	Legislation	Supranational	Governmental agencies	EU Member States
Commission Communication of 26th September 2003; COM (2003) 567 (e-Government) (European Commission (2001))	Legislation	Supranational	Governmental agencies	EU Member States
Decision No 70/2008/EC on a paperless environment for customs and trade (European Commission (2008))	Legislation	Supranational	Governmental agencies	EU Member States, import partners
Regulation of the European Parliament and of the Council laying down the Community Customs Code (Modernized Customs Code) COM (2005) 608 Final (European Commission (2005c))	Legislation	Supranational	Governmental agencies	EU Member States, import partners

[3] Bibliographical references are provided in Annex VIII.

Annex 2 to MASP - Electronic customs systems and projects, 2007 Yearly Revision (TAXUD/477/2004 Rev.8) (European Commission (2007a))	Legislation	Supranational	Governmental agencies	EU Member States
Electronic Customs Multi-Annual Strategic Plan (MASP Rev 7) (European Commission (2006d))	Legislation	Supranational	Governmental agencies	EU Member States
International Convention on Frontier Controls OJ 1984 No L 126/3 (cf. European Comnmission (2006d), p. 18)	Legislation	Supranational	Governmental agencies	EU Member States, import partners
Council Regulation No 2913/92 of 12 October 1992 (Community Customs Code) (European Commission (1992))	Legislation	Supranational	Governmental agencies	EU Member States
Council Directive 92/12/EEC of 25th February 1992 (Excise Duty) (European Commission (2003b))	Legislation	Supranational	Governmental agencies	EU Member States
Articles 7(3) and 10(3) of Council Directive 77/388/EEC of 17 May 1977 (European Economic Community (1977), p. 7-9)	Legislation	Supranational	Governmental agencies	EU Member States
Commission Communication of 28th May 2002; COM (2002) 263 (e-Europe Action Plan) based on (European Union (2000))	Legislation	Supranational	Governmental agencies	EU Member States
Communication from the Commission to the Council, the European Parliament and the Economic and Social Committee concerning a strategy for the Customs Union; COM (2001) 51 Final (European Commission (2001))	Legislation	Supranational	Governmental agencies	EU Member States
AEO EU Authorized Economic Operator (European Commission (2007b))	Legislation	Supranational	Governmental agencies	EU Member States
Single Window at EU Community Level (Modernized Customs Code) (European Commission (2006b, 2006e))	Legislation	Supranational	Governmental agencies	EU Member States
Single European Authorization (SEA) (European Commission (2007f))	Legislation	Supranational	Governmental agencies	EU Member States
Standardized Framework for Risk Management in the Customs Administrations of the EU (European Commission (2007g))	Legislation	Supranational	Governmental agencies	EU Member States
Customs Blueprint - Pathways to Modern Customs (European Commission (2007c))	Legislation	Supranational	Governmental agencies	EU Member States, import partners
Revised Kyoto Convention (WCO (2006c))	Convention	Global	Inter-governmental organization	WCO member driven

Global Annex of the Revised Kyoto Convention and Special Annexes of the Revised Kyoto Convention (WCO (2006c))	Convention	Global	Inter-governmental organization	WCO member driven
WCO SAFE Framework of Standards (WCO (2007b))	Convention	Global	Inter-governmental organization	WCO member driven
Material concerning customs operations World Bank Group: Customs modernization handbook (The World Bank (2005)) World Bank Group: Customs modernization initiatives (The World Bank (2004))	Publication	International	Non-governmental organization	
Material concerning 100% Scanning law SAFE versus 100% Scanning: Interview with Michael Schmitz (WCO (2008c)) New United States Legal Requirements for 100% Cargo Scanning, the WCO Position (WCO (2008b)) 100% Scanning: The European Strategy (WCO (2008a))	Publication	International	Non-governmental	

6.2 The Concept of B2G

Core elements of B2G are governmental and non-governmental actors. This section introduces a simplified model that covers physical and non-physical interactions between governmental and non-governmental actors for customs. For simplification reason, financial transactions are excluded from the elaboration. Hence, physical interactions relate to goods movements and non-physical interactions focus on data exchange among actors. Figure 6.1 depicts these relationships. Governmental actors aggregate legislation, health and public security authorities, homeland security bureaus, customs and tax authorities. Business actors represent product related companies and service providers as well as other business partners involved in trading, moving, selling, and storing goods.

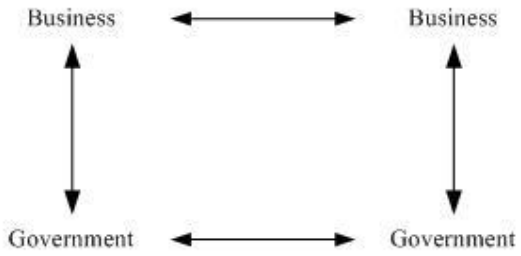


Figure 6.1: Actors involved in export

Denoting interactions in the above-introduced model, Figure 6.2 adds the interaction types trade, declare, regulate, and inform. Exporting and importing goods movements stimulate inter-organizational collaboration. In government-to-government relationships, actors exchange export and import relevant declaration details, risk assessment results, and further information concerning industry-specific certificates and excise relevant information. Government-to-business interactions base on regulation driven procedures and declaration needs to be submitted to governmental authorities. The number of interactions increases by activities such as to submit, approve, change, modify, re-submit, and receive declarations and certificates. Furthermore, customs authorities conduct physical product, shipment, and vessel controls including security concerned product and shipment screenings along the supply chain.

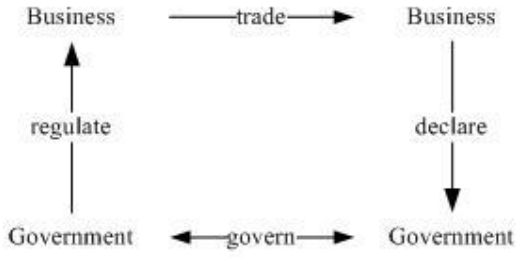


Figure 6.2: Business-government-interactions in export

Business-to-business activities embrace manufacturer-supplier relationships to agree upon goods delivery, transport means, and shipment details. Governments regulate and businesses declare. Regulatory measures cover non-physical interactions in form of issuing regulatory measures, directives, and customs codes. In the area of physical interactions, governmental actors conduct container inspections, recipe controls, and physical declaration checks at harbors and loading sites. Governmental authorities inform customs authorities about declaration information and report to statistical and taxation bureaus on statistical and taxation relevant data of excise goods movements. Businesses align with government to declare goods, process data, and provide information.

As denoted in the above introduced model and confirmed by the empirical study, business and government relationships share a large number of interactions that take place in different geographical and technical formats. An independent study collected around 25 different governmental and business actors that are involved in an export process (cf. Gonzalez (2006), p. 4-3). Actor roles divide into business and governmental actors (Figure 6.3).

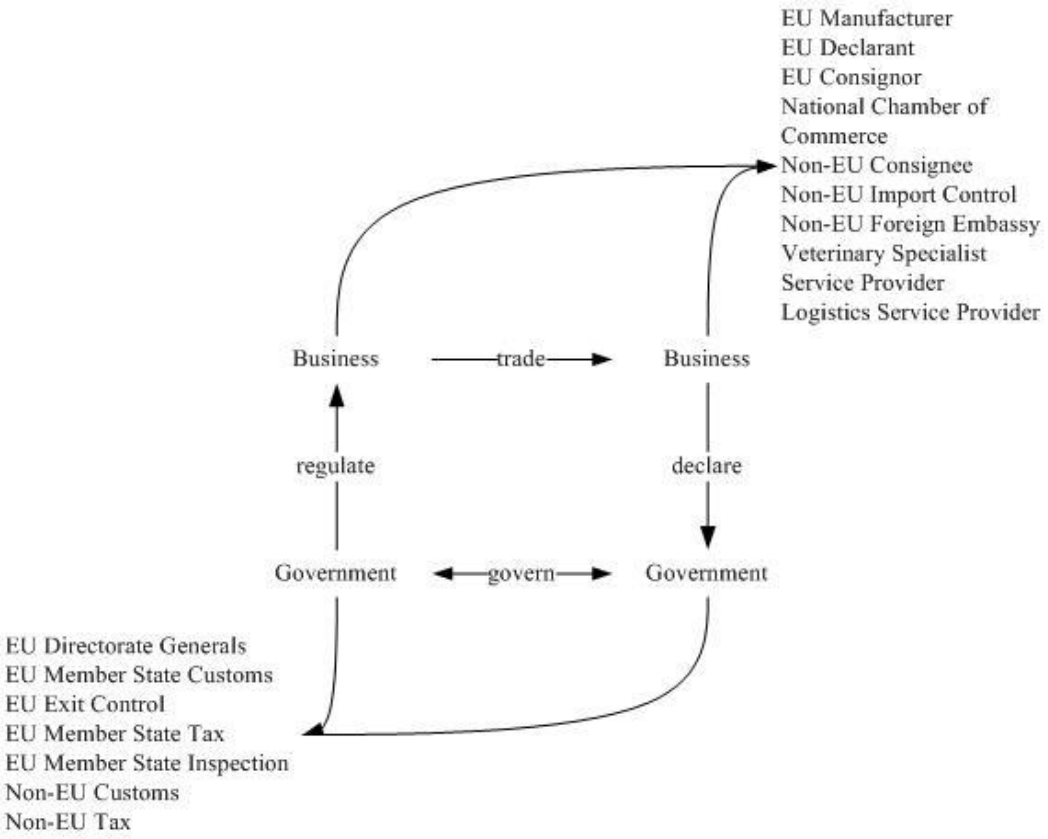


Figure 6.3: Actor roles involved in export

The choreography of interactions and performance of export activities is dependent on efficient and accurate processing of products and data. To-date export and shipment relevant data materialize in around 35 different documents (cf. Gonzalez (2006), p. 4-3). Those ground largely in legal texts. Customs-to-customs interactions expect a similar number of interaction occurrences. Due to increased export volumes and a growing number of trade and security agreements, a tighter and efficient integration among authorities is required. Interaction occurrences and amount of data will increase because of an increasing number of security measures for goods, shipment means, and personnel.

6.3 Building Blocks of B2G

Building upon the overall understanding of B2G collaboration depicted in the form of the simplified model (see **Figure 6.2**), the procedure model embraces building elements and characteristics. Relevant analytical and modeling activities apply guidelines from the business engineering methodology as outlined by (Winter (2003)) and further elaborated by (Braun & Winter (2005)). Institutional construction builds on Scott's Analytical Framework II (AFII). AF II distinguishes collaboration levels from world system, societies, to organizations and organizational units (Figure 6.4). Connecting links between each of the organizational constructs denote linkages.

Figure 6.4: Levels of investigation in the Analytical Framework II

The AFII considers multiple levels of institutional study: individual, organizational, and cross-organizational levels. Hereby, AFII aims for the inclusion of governmental actors on distinct levels of analysis and organizational constructs (cf. Scott (2001), p. 199). Or as stated by Scott, "no single study can hope to definitively analyze all of the causal connections across levels for a complex institutional arrangement, the most informative studies are those that identify and trade the effects […] across two or more levels […]" (Scott (2001), p. 196). The following figure depicts Scott's generic and multi-level model of institutional connectedness among these levels (Figure 6.5). The interaction among levels is illustrated by examples of inter-organizational flows, namely diffuse, impose, invent, negotiate, sanction, interpret, innovate, avoid, and sense making. The interaction among organizational constructs as for example between organizations and the society is bidirectional (ibid., p. 196): the interaction top-down allows the analysis

how constructs shape, constrain, and influence others. The interaction bottom-up serves to analyze if constructs or individual actors employed, changed, or varied in the implementation of an institutional force such as a regulation. The outline of Scott's model serves to illustrate the openness of the model but also the challenges to apply it to a specific context.

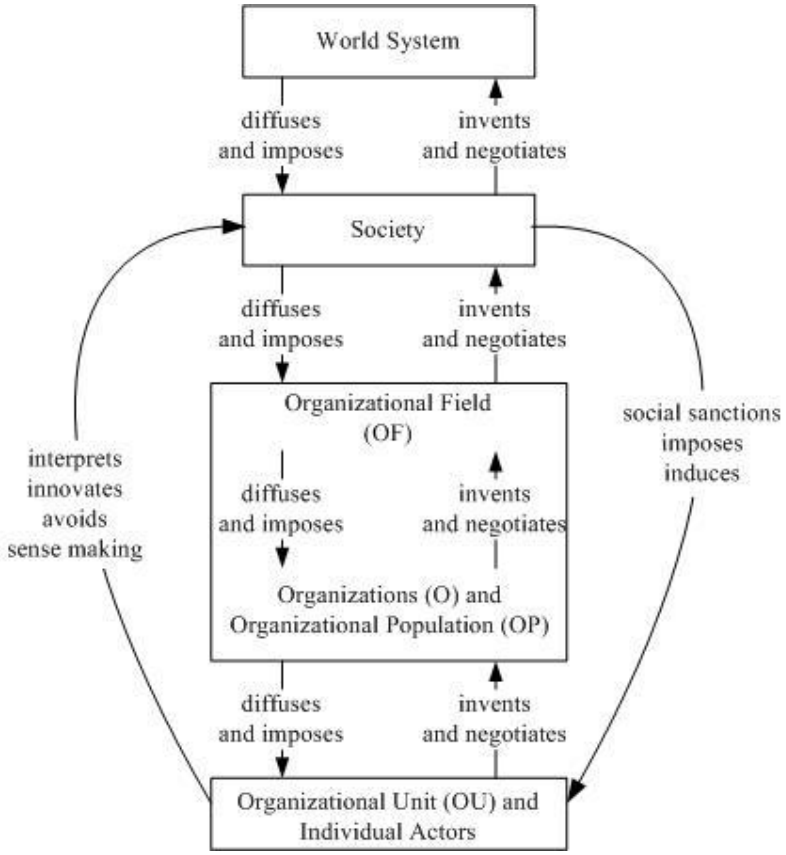


Figure 6.5: Connectedness and institutional levels in the Analytical Framework II

Bearing the multi-level model of the AFII in mind, it is applicable to the research in this dissertation for the following reasons. Firstly, AFII addresses inter-organizational analysis reflecting organizations' need to cope with regulatory demands. Previous sections revealed the need of regulatory disclosure in export. The analysis of collaboration schemas in the study discloses distinct levels of organizations and groups involved. Secondly, Scott emphasizes the importance of binding elements that connect organizations on different levels and beyond industries and regions (cf. Scott (2001), p. 84). Examples are rules, laws, or IS standards. Legislation authorities address the need of IS standards and standardized applications. They started to embed IT requirements directly into regulatory directives and legally binding material such as the Annexes of the Revised Kyoto Convention. As previously elaborated, recent examples are the US

law and the Modernized Customs Code. Thirdly, research discloses how regulations address IS standards and standardization needs when fostering IT-driven collaboration and facilitating inter-organizational collaboration through regulatory measures (cf. Foutain (2002), p. 8-9). Fourthly, to-date there are few examples that refer to AFII as outlined in Figure 6.4. Examples take into account the density of organizational engagement in business and governmental activities (cf. Björck (2004), p. 2) and industry-specific parameters of organizational engagement in life sciences (cf. Powell, White, Kobut, & Owen-Smith (2005), p. 9-10), healthcare (Guah (2007)), and agriculture (Lynggaard (2001, 2005)). Others focus on users acting within a pre-selected layer of analysis (cf. Rowlands (2008), p. 859), and the role of inter-organizational constructs such as trade associations (cf. Damsgaard & Lyytinen (2001), p. 197-198). Missing cross-organizational models that accommodate regulatory and standard aspects on a global scale have so far hampered AFII ’s use in practice.

The following sections apply AFII for B2G. Levels of investigation and interrelatedness of actors form the analysis of AFII elements. These are organizational constructs (Section 6.3.1), institutional constructs (Section 6.3.2), and carrier specific constructs (Section 6.3.3).

6.3.1 Organizational Constructs in B2G

As outlined before, AFII provides a set of organizational constructs that are applicable to the field of customs. After an introduction of each of the constructs in this section, the mapping and detailing of the constructs to actor roles encountered takes place.

Organizational subsystems (OUs) are units that perform activities within an organization and are active on an intra-organizational basis. Examples are logistics departments, order processing, accounting, or controlling (cf. Scott (2001), p. 88-89). An organization (O) is a legally independent organization, regardless of its operations in the public (governmental) or private (business) sector (cf. Scott (2001), p. 88-89). Alike organizations that conduct similar tasks and similar set of operational activities aggregate to an organizational population (OP) (cf. Scott (2001), p. 84). An organizational field (OF) is “a result of the activities of a diverse set of organizations and that refers to the totality of relevant actors“ (Scott (2001), p. 84). The organizational field plays a “vital role in connecting organization studies to wider […] sectoral, societal, and transnational [structures]” (Scott (2008), p. 182). Organizational constructs that operate in an OF are “organizations that constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other

organizations that produce similar services or products“ (DiMaggio & Powell (1983), p. 148).

Organizations follow the structure of actor roles in this work. Customs administrations and declarants are two of the detected roles. The scope of organizations in this work focuses on those that operate in export. With respect to discrepancies in organizational viewpoints, tax and customs administrations operate in some countries independently from each other, in others they merged into one organization. In most of the cases, they report to the Ministry of Finance. For simplification reasons in this work, tax and customs administrations function as individual organizations and therefore aggregate into distinct organizational populations. OPs follow the same manual and documentation is available. Examples of an OP are tax administrations that conduct comparable tax services and aggregate to OP Tax administrations. Manufacturers that conduct comparable supply, storage, and production activities are referred to hereby as OP Manufacturers.

This dissertation applies Scott’s mode of distinguishing organizations and organizational populations accordingly for business and government, namely governmental organizations, business organizations, governmental organizational populations and business organizational populations. Business organizations aggregate to a business organizational population in case they apply common best practices, process templates, and ERP-based transactions define core activities of business organizations and are available in form of business process repositories and accessible through industry-bounded standards. In case of governmental organizations and governmental organizational populations, activities are accessible in the form of formal legislation or in other sources of information such as the online library of European legislation (EUR-LEX) (European Union (2009)). In case of statistical reporting, national statistics aggregate to an organizational population bureaus of statistics. They are alike due to Intrastat and Extrastat guidelines. The organizational population port authority on the other hand derives from operational manuals on how to process goods and document goods movements in any port worldwide.

The differentiation of business organizations, governmental organizations, business organizational populations, and governmental organizational populations in this approach is as follows. Letters 'B' and 'G' in front of OP and O differentiate the organizational root and therefore purpose of an organization and organization population. Letters differentiate business and governmental roots where relevant and necessary. In case of an organizational field (OF), the abbreviation BOF for example indicates that the OF is purely business oriented and does not include governmental

organizations. Otherwise, the abbreviation is GOF. Neither BOF nor GOF are found useful in the present research. As the dissertation focuses on B2G collaborations and dedicates an OF to export and in particular customs activities jointly shared by governmental and business actors, a BOF or GOF does not exist. Concerning BOPs those aggregate to business OPs. GOPs aggregate governmental OPs such as OP Customs or OP Tax. Interrelatedness of Os and OPs is illustrated in Figure 6.6.

Figure 6.6: Apparent organizational constructs in the OF

As previously outlined, B2G involves so-called inter-governmental organizations such as WCO and WTO. At the point of deciding upon scope and elements of inter-governmental organizations (IGOs) and inter-governmental organizational populations (IGOPs) the decision is made with reservation. The usefulness of the institutional elements IGO and IGOP proves along the modeling. The assumption so far is the following. In case of WTO, OPs need to prove that WTO-based measures comply with WTO agreements. Otherwise, procedural details differ from organization to organization and organizations do not aggregate to a GOP. In case of the World Customs Organization (WCO), the Revised Kyoto Convention defines and publishes procedural templates that synchronize and assimilate activities for customs organizations. If institutional organizations such as customs organizations (Os) follow those templates, they are subject to critical scrutiny. Including the relationships of business and governmental actors with inter-governmental organizations, organizational constructs expand by inter-governmental organizations and populations (Figure 6.7).

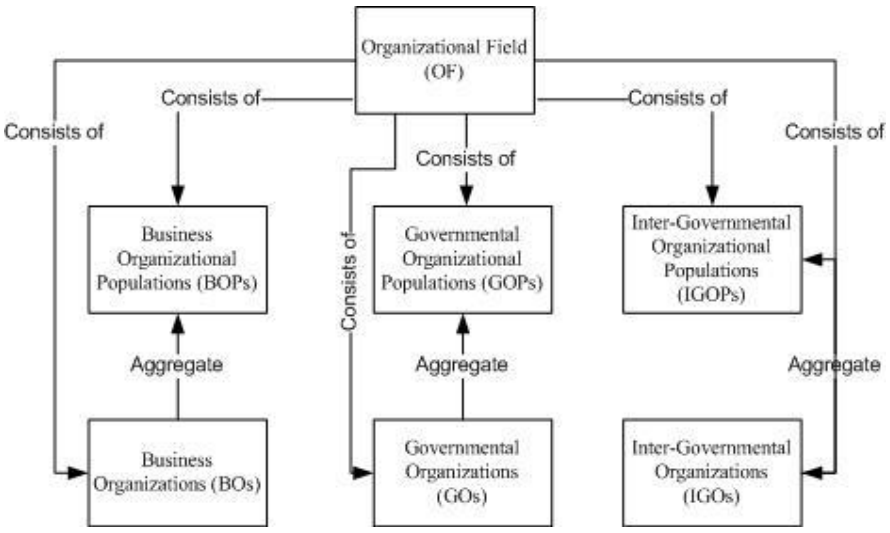


Figure 6.7: Business, governmental, and inter-governmental constructs in the OF

Based on present empirical investigation the OF Customs integrates business and governmental actor domains where actors rationalize their membership to the OF by a long-term focus and the ability to improve operational performance. In addition, actors are bound to an OF through a common regulatory system. In the underlying case, the OF Customs fulfills the characteristic of an institutional life. Different roles in governmental and business domains perform within the OF (Table 5.5). One example of a commonly applied regulatory system in the OF Customs is the Modernized Customs Code or those Annexes of the Revised Kyoto Convention that transpose into national and supranational legislation.

World and Societal levels in this work refer to further levels of analysis as applied for example by (Dobbin (1994); North & Thomas (1973); Parsons (1953)). Following the scope of present research, the OF export operates within the World System and the Society. World System and Society from an institutional perspective are given. With respect to organizational subsystems (OUs), OUs are not part of this work due to their focus on intra-organizational activities and interrelatedness of intra-organizational departments.

Concerning actors that collaborate in a network, they are subject in network organization research according to the institutional role they perform in the network. Interpreting the understanding of Brass and Klein, actors are found on the organizational level and not on the organizational subunit or departmental level. Overall in B2G, two actor domains are encountered: the governmental and the business domain. Thus, the government and business domains subsume into governmental organizations (GOs) and business organizations (BOs). On the level of organizational populations

(GOPs or BOPs), the business and governmental domains subsume into governmental organizational populations (GOPs) and business organizational populations (BOPs). Layers of aggregation (organizational field and organizational populations) and decomposition (organizations) do not differ because of the actor domain. Business and governmental layers weigh equally. The OF Customs consists of multiple Ops and Os, minimum one GOP, one BOP, one GO, and one BO. An OP decomposes into Os and an OP exists of a minimum of one or more Os. A GOP decomposes into nothing else than GOs and a BOP into nothing else than BOs. An O decomposes into multiple OUs if relevant in further studies.

The analysis of organizations and domains at distinct levels took place in the course of the case study and is supplemented by the analysis of regulatory and supplementing sources of material as referenced in Table 6.4 (see **Table 6.4**). The results of the analysis are organizational constructs. The modeling of the organizational constructs and their interconnectivity (so called linkage analysis) took place in five steps and in the following order (Figure 6.8). Activities and results are as follows.

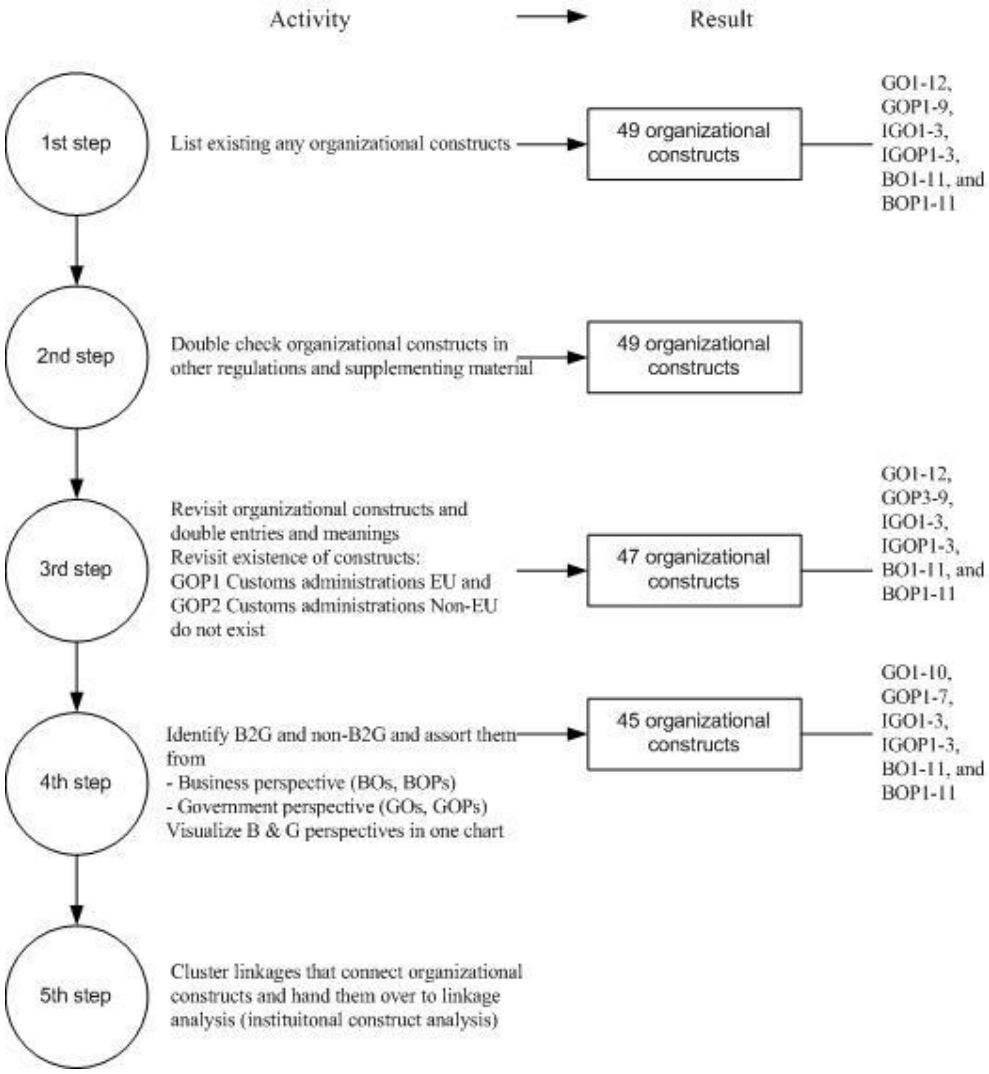


Figure 6.8: Modeling approach for organizational constructs

Overall, 49 organizational constructs were identified. Business organizations and operational populations are as follows (Table 6.5). BOs and BOPs have a 1:1 relationship: BO1 aggregates into BOP1 and so forth. The aggregation of organizations to organizational populations follows the approach of aggregating alike organizations (cf. Scott (2001), p. 84). Herein, an organizational population could be an industrial association or a trade union. Further examples are bundled organizations such as chambers of commerce.

Table 6.5: Business relevant organizational constructs in B2G

Business Organization (BOs) aggregate 1:1 to corresponding Business Organizational Populations (BOPs)			
BO1	Manufacturer	BOP1	Manufacturers
BO2	Declarant	BOP2	Declarants
BO3	Consignor	BOP3	Consignors
BO4	Chamber of Commerce	BOP4	Chambers of Commerce
BO5	Certification Service	BOP5	Certification Services
BO6	Port operator	BOP6	Port operators
BO7	Logistics Service Provider	BOP7	Logistics Service Providers
BO8	Carrier	BOP8	Carriers
BO9	Consignee	BOP9	Consignees
BO10	Customer	BOP10	Customers
BO11	Authorized Economic Operator	BOP11	Authorized Economic Operators

Inter-governmental organizations (Table 6.6) and organizational populations are as follows (Table 6.7). The inclusion of inter-governmental constructs requires further explanation and arguments. Those are included in Tables 6.4 and 6.7.

Table 6.6: Inter-governmental organizational constructs in B2G, 1st part

Inter-governmental Organizations (IGOs) and supporting arguments for their inclusion in OF Export		
IGO1	WCO	B2G collaboration grounds on the transposition of the Revised Kyoto Convention into national and supranational legislation issued by the WCO.
IGO2	WTO	Export and therefore B2G is influenced by bilateral and multilateral agreements designed and conducted among WTO-members.
IGO3	UNECE	UNECE represents those standard development organizations that publish IS standards following the definition in this work.

Table 6.7: Inter-governmental organizational constructs in B2G, 2nd part

Inter-governmental organizational populations (IGOPs) and motivation for aggregating IGOs to IGOPs		
IGOP1	WCO	WCO members signed an agreement to follow guidelines and conduct WCO-relevant operations accordingly. WCO members are formally the customs territories that accepted the WCO membership conditions. Customs territories of Germany or Denmark are WCO members. In case of the European Union, the EU Customs Union, an artificial construct of any customs territories of the EU member states, is an official WCO member.
IGOP2	WTO	WTO members like WCO members signed off a formal agreement that outlines the conduction of tasks and activities. Unlike WCO, the European Union is not member of WTO but the EU Commissioner for Foreign Trade. Germany and further EU Member States as well as non-EU states are WTO members if they agreed to the WTO statutes.
IGOP3	Inter-governmental organizations	The aggregation to IGOP3 summarizes inter-governmental organizations and their activities.

In the case of government relevant organizations, they do not aggregate into organizational populations necessarily (Table 6.8). One example is the EU Customs Union (GOP9) and its role and construct in IGOP3. Concerning the European Administration, GO12 represents the organizational construct of the EU Administration as an individual organization. Another example refers to the role of embassies in the export reference process. From an aggregation point of view an embassy (GO9) does not aggregate into embassies, but belongs to the country it represents (GO10 or GO11).

Table 6.8: Government relevant organizational constructs in B2G

Government Organizations (GOs)			Government Organization Populations (GOPs)	
GO1	Customs administration of EU member states	Aggregate to	GOP1	Customs administrations of EU member states
GO2	Customs administration of non-EU states	Aggregate to	GOP2	Customs administrations of non-EU states
GO3	Tax administration	Aggregate to	GOP3	Tax administrations
GO4	Food administration	Aggregation is not apparent		
GO5	Bureau of national statistics	Aggregate to	GOP4	Bureaus of statistics
GO6	Inspection service agency	Aggregate to	GOP5	Inspection agencies
GO7	Port authority	Aggregate to	GOP6	Port authorities
GO8	EU Commissioner for Foreign Trade	Aggregation is not applicable.		
GO9	Embassy acting as national representation	As national representation, embassies act on behalf of states they represent. Thus, aggregation is not applicable.		
GO10	Regulatory authority of any EU member state	Aggregate to	GOP7	EU member states, also referred to as EU community
			GOP9	EU customs union: GOP9 is a construct that aggregates customs territories of any EU member state (GO10) and that represents the single market of the EU as one unique trading area of the European Union.
GO11	Regulatory authority of any Non-EU state	Aggregate to	GOP8	Non-EU states
GO12	EU administration	GO12 is the organizational construct that represents the EU as organization. Due to its uniqueness based on supranational law, an aggregation is not applicable here.		

Figure 6.9 illustrates the organizational field of export with examples extracted from the previous assessment in business, governmental, and inter-governmental constructs.

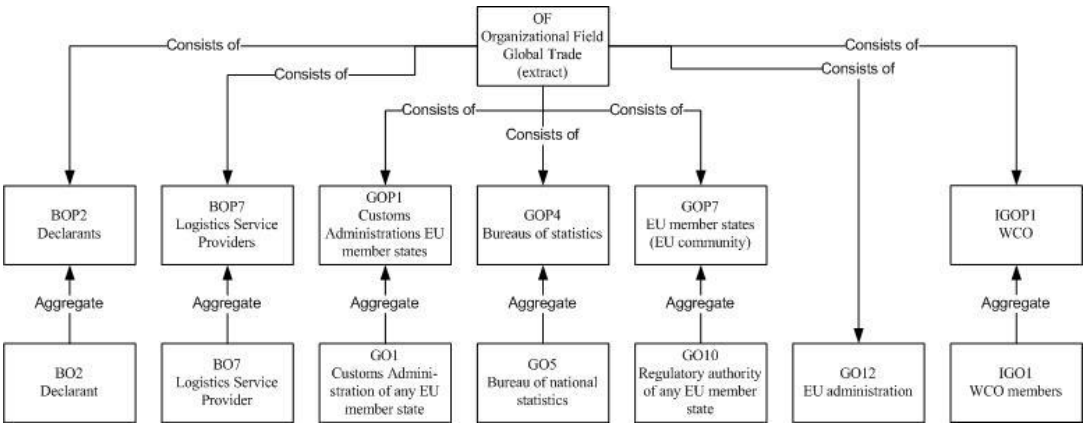


Figure 6.9: Examples of organizational constructs in the OF

Organizational constructs were under review and corrected if needed (Figure 6.10). These are GOP1 and GOP2 customs administration populations and IGOP1 inter-governmental organizational populations. The latter showed differences in business-to-government activities concerning customs and trade. WCO and WTO therefore do not aggregate under one IGOP. Concerning GOP customs administration for EU Member States and for non-EU states, operational manuals that regulate coherent operational activities do not exist (cf. The World Bank (2005), p. 60-61). EU customs administrations (GO1) therefore do not aggregate to one GOP customs administration (GOP1 customs administration).

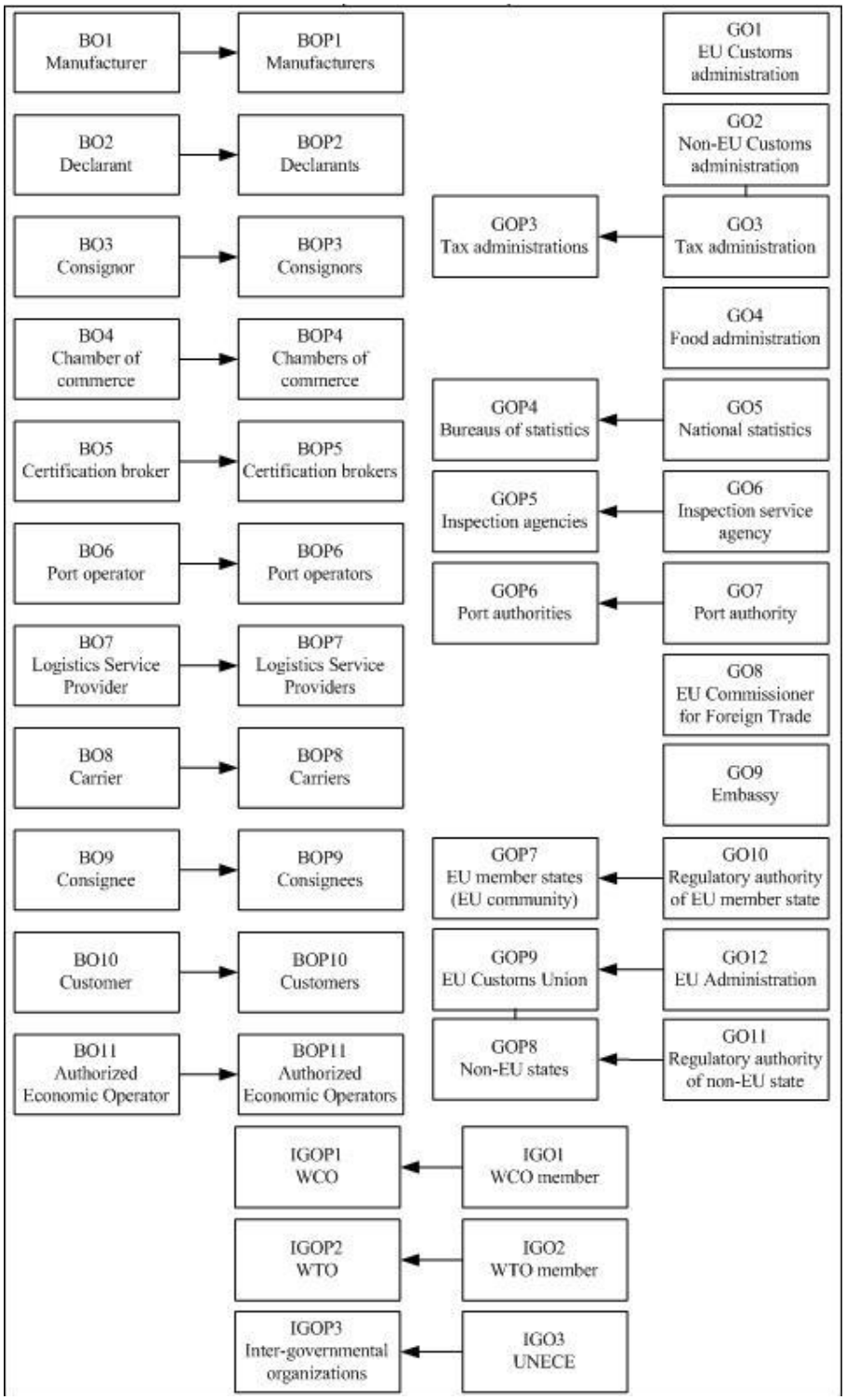


Figure 6.10: Organizational constructs in the Organizational Field of Customs

6.3.2 Institutional Constructs in B2G

The subjects of this section are the linkages that connect organizational constructs. Collaborating constructs have one or more linkages. Linkages form due to regulatory and contractual obligations such as the Modernized Customs Code, national legislation, and commercial contracts. Regulatory obligations bind business and governmental actors within the OF export and relevant OPs together and connect two or more actors. Linkages affect OPs as well as Os. In addition, linkages refer to recommendations issued by the WCO and WTO, and contractual agreements between actors such as commercial contracts to certification relevant services (linkage a), exchange of information (linkage b), and inspection services as for example goods control (linkage c). In the example, three distinct linkages a, b, and c connect then declarants and a customs administration of an EU member state (Figure 6.11).

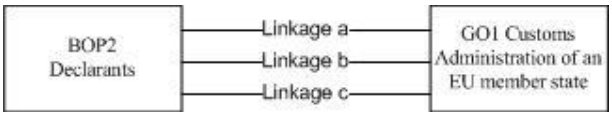


Figure 6.11: Linkages between two organizational constructs

Thus, linkages are institutional constructs in the sense that they connect organizational constructs. As such, they form the boundaries of an organizational field. Any institutional construct introduced in this work bases on an analysis of publicly available and export relevant regulations and supplementing material that depicts B2G activities (Table 6.4). The analysis of linkages within the organizational field export builds on the assessment of 45 organizational constructs and their interactions. The modeling of institutional constructs took place in six steps and in the following order (Figure 6.12).

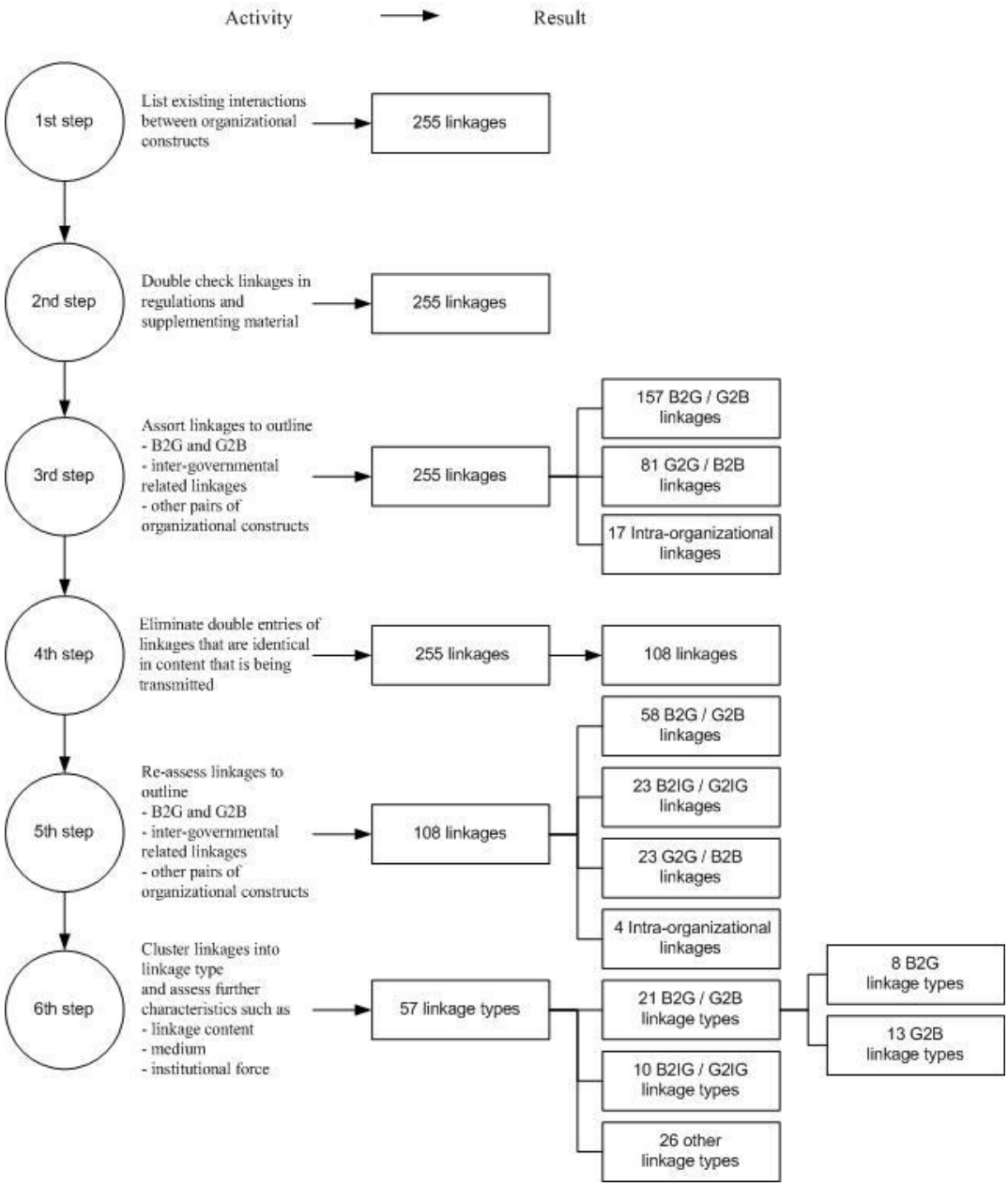


Figure 6.12: Modeling approach for institutional constructs

The assessment of linkages refined along conducted steps with dedicated focus on B2G; see steps 5 and 6. The analysis applied a textual, qualitative analysis of regulatory sources (see **Table 6.4**). It refers to research made by Verharen who proposes a functional grammar-based analysis (cf. Verharen (1997)). His proposition applies to inter-organizational information exchange that contains an analysis of authorization, communication, tasks, and content (cf. Iglesias, Garijo, & González (1999)). The dissertation adapts the task analysis between actors by focusing on content that is exchanged in form of tasks in a certain order between actors (cf. Verharen, Dignum, &

Weigand (1996)). A task is described in a grammar format and reflects a meaningful unit of one or more activities (ibid., p. 46). Unlike the language/action perspective, sources of interactions in B2G are not limited to contracts but specify other forms of obligations between different parties (ibid., p. 47). Therefore, a subject-verb-object analysis is used to reveal these details. The subject-verb-object analysis in any of the texts revealed relationships between organizational constructs. Those follow the definition of organizational constructs as introduced in Section 6.2.1 (Tables 6.5, 6.6, and 6.7). Organizational constructs that are part of the linkage analysis are those of **Figure 6.10**. Table 6.9 gives two examples of subject-verb-object analysis.

Table 6.9: Exemplified subject-verb-object analysis

Subject (from)	Verb		Object (to)
	Linkage	Linkage content	
GO11: non-EU member state	Comply with	100% physical security measures	BOP7: carriers BOP8: logistics service providers
GO1: customs administration of any EU member state	Ease	Data lodging for single access point	BOP8: logistics service providers

Applying the format from above, the analysis resulted overall in unclassified 255 linkages of which 108 distinct linkages affect organizational constructs, as depicted in Figure 6.15. **Table A.9.11** contains the entire list of interactions that are the sources for classification and categorization; it is attached in the form of an Excel file in a separate file for reasons of simplification (see **Table A.9.11**). Fifty-eight of them connect business and governmental constructs. Figure 6.13 gives an idea of the interaction density concerning various organizational constructs. The visualization of interactions shows bundled interactions where some organizational constructs have a larger number of linkages than others: declarants (BOP2) interact more than for example port operators (BOP6). The analysis focused on B2G and G2B activities. Analytical results concerning B2B and G2G are available for further studies. Due to a high involvement of inter-governmental constructs, they are still subject to the model. As illustrated in Figure 6.14, the interaction between the organizational constructs that are depicted in the previously outlined Figures 6.13 and 6.14 looks as follows.

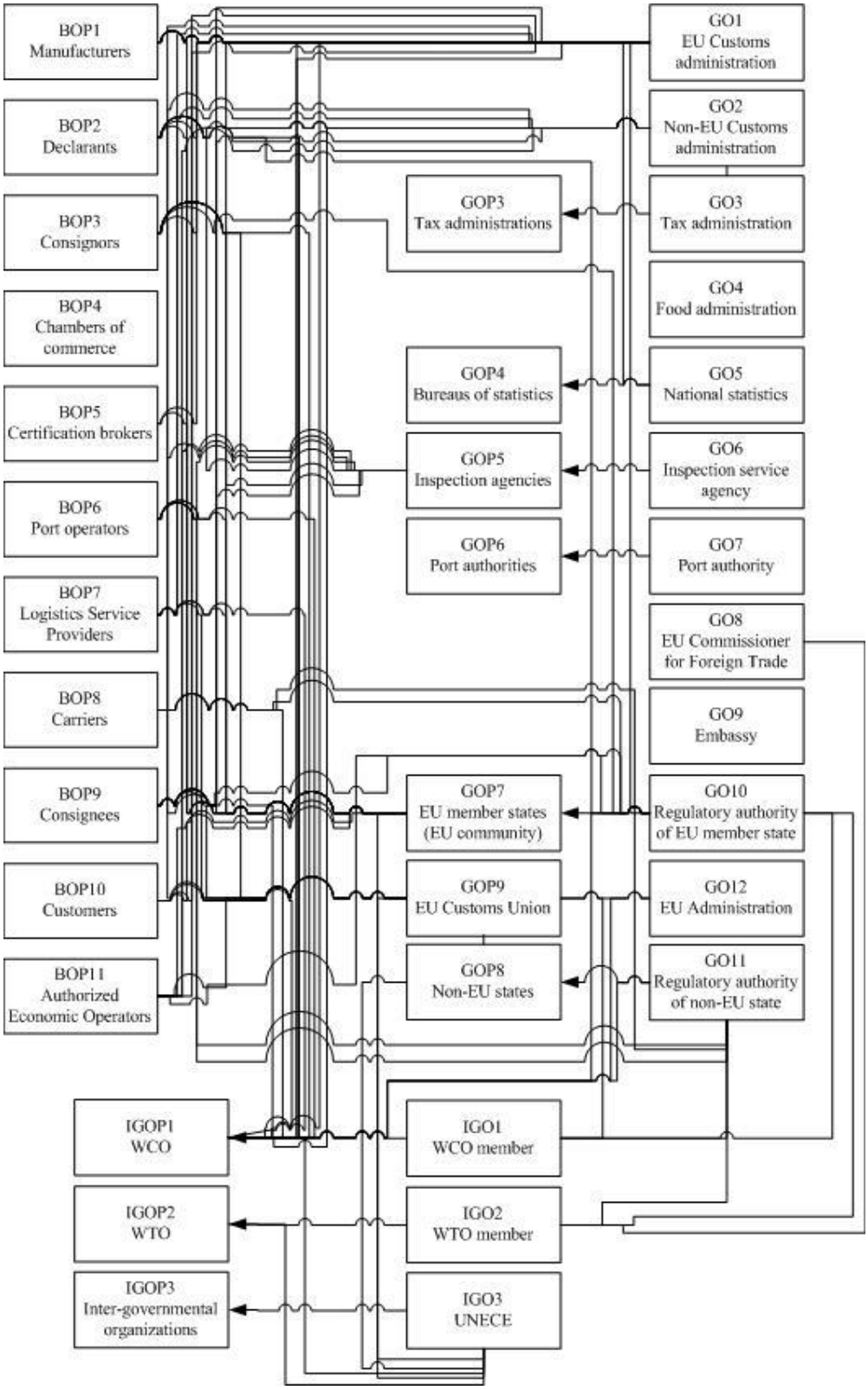


Figure 6.13: Interrelatedness of organizational constructs in the OF

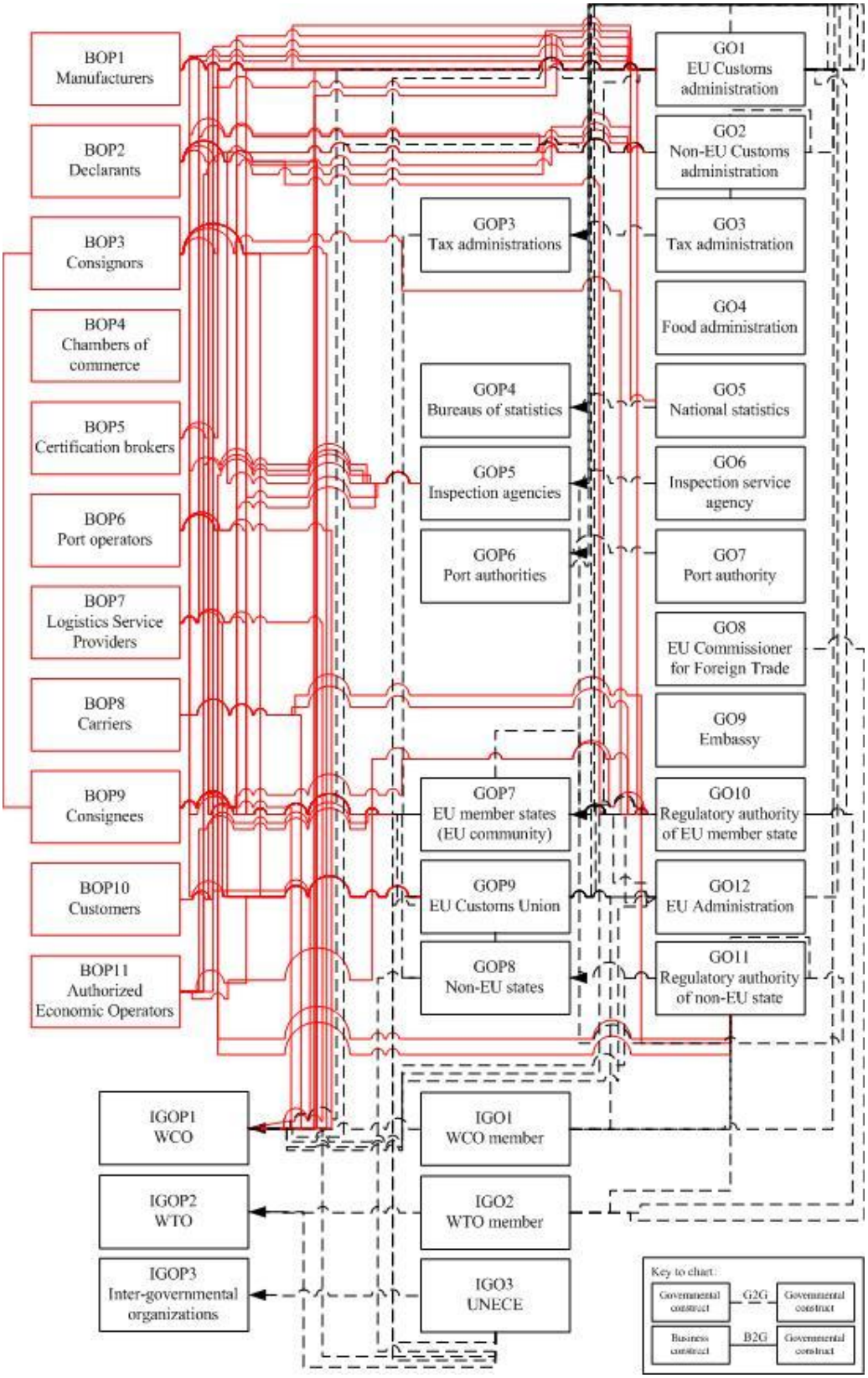


Figure 6.14: B2G interrelatedness in the OF

From	From	Linkage type	To	To
BOP1	manufacturers	submit	GO1	customs administration of an EU member state
BOP1	manufacturers	provides information	GO1	customs administration of an EU member state
BOP1	manufacturers	submit data	GO1	customs administration of an EU member state
BOP1	manufacturers	submit data	GO10	non-Customs legislation of an EU member state
BOP1	manufacturers	submit	GO2	Non-EU customs administration
BOP1	manufacturers	submit	GOP5	inspection agencies
BOP1	manufacturers_SMEs	are part of	OF	OF Global Trade
BOP11	authorized economic operators	give access	GO1	customs administration of an EU member state
BOP11	authorized economic operators	submit	GO1	customs administration of an EU member state
BOP11	authorized economic operators	provides information	GO1	customs administration of an EU member state
BOP11	authorized economic operators	exchange	GO1	customs administration of an EU member state
BOP11	authorized economic operators	operate with	GO1	customs administration of an EU member state
BOP11	authorized economic operators	submit data	GO1	customs administration of an EU member state
BOP11	authorized economic operators	submit data	GO10	non-Customs legislation of an EU member state
BOP11	authorized economic operators	submit	GO2	Non-EU customs administration
BOP11	authorized economic operators	submit	GOP5	inspection agencies
BOP11	authorized economic operators	operate with?	GOP9	EU Customs Union
BOP11	authorized economic operators	is	O	Person
BOP2	declarants	submit	GO1	customs administration of an EU member state
BOP2	declarants	submit	GO1	customs administration of an EU member state

Figure 6.15: Extract of B2G interactions

The further analysis, clustering, and detailing as well as documentation of linkages required a more detailed format than subject-verb-object. The modeling in steps five and six adheres to that format:

- ‘Linkage’ represents interactions between organizational constructs. Verbs reflect linkages and are subject to textual analysis. Organizational constructs are sender (subject) and receiver (object).
- ‘Linkage type’ is the result of clustering linkages.
- ‘Linkage content’ is referring to the content that transmits through linkages.
- ‘Institutional forces’ cause interactions. Examples are regulations, technical innovations, and business-driven demand. A ‘softening factor’ is necessary to distinguish recommendations issued by governmental constructs and regulations that become legally binding.
- ‘Medium’ indicates the format by which content is made available between organizational constructs.
- ‘Medium types’ encountered in the analysis are electronic, form based, and standardized.

Any of the detected linkages adhere to above-outlined format and are documented as such. Figure 6.16 lists an extract of 108 assessed linkages. These are examples of the 108 assessed linkages.

From	To	Linkage type	Medium	Linkage content	Linkage type	Institutional force 1
BOP1	GO1	submit		customs declaration related information		
BOP1	GO1	provides information	once, single portal, accessible, standardized, electronically	information, documentation, trade registration, etc.	import, export, and transit regulatory requirements (legislation)	Regulation of the Eu and of the Council la Community Custom
BOP1	GO1	submit data	electronically	export and import relevant data		Single Window at E Level (Modernized
BOP1	GO10	submit data	electronically	export and import relevant data		Single Window at E Level (Modernized
BOP1	GO2	submit		customs declaration related information		
BOP1	GOP5	submit		customs declaration related information		
BOP1	OF	are part of				
BOP11	GO1	give access	electronically	customs declaration related information		Regulation of the Eu and of the Council la Community Custom
BOP11	GO1	submit		customs declaration related information		
BOP11	GO1	provides information	once, single portal, accessible, standardized, electronically	information, documentation, trade registration, etc.	import, export, and transit regulatory requirements (legislation)	Regulation of the Eu and of the Council la Community Custom
BOP11	GO1	exchange	electronically	data, accompanying documents, decisions, and notifications		Regulation of the Eu and of the Council la Community Custom
BOP11	GO1	operate with		Modernized Customs Code instead of Community Customs Code		need of regulatory f establish common st are related to proce
BOP11	GO1	submit data	electronically	export and import relevant data		Single Window at E Level (Modernized
BOP11	GO10	submit data	electronically	export and import relevant data		Single Window at E Level (Modernized
BOP11	GO2	submit		customs declaration related information		
BOP11	GOP5	submit		customs declaration related information		

Figure 6.16: Extract of formatted B2G

One example of the 108 linkages from Figure 6.15 is illustrated below (Table 6.10).

Table 6.10: Format for linkage analysis

From	To	Linkage	Medium	Linkage content	Institutional force
GO11	BOP7 BOP8	Mandate	physical	100% scanning security measure	US Law "Implementing Recommendations of the United States 9/11 Commission Act of 2007"

The example shows that linkages apply to one or more organizational constructs, in this example to BOP7 and BOP8. A further analysis of multi-referenced organizational constructs reveals bundled actors that are subject to governmental imposed interactions (Table 6.11). Most commonly bundled actors embrace actors that handle goods movements and trade activities in cross-border scenarios. Others refer to actors that are in charge of certificate and form processing.

Table 6.11: Multi-referenced actors

Linkages	Linkage content	Actors referenced
Conduct, manage, give access	Physical export and import processing	BOP1, BOP5, BOP7, BOP8
Control, process, complete, submit	Forms and documents	BOP2, BOP5, BOP7, BOP8, BOP9

Referring to content that is subject of B2G activities, the content concerns procedural details of import and export specific activities and operational tasks that actors need to include in their business and governmental operations. The content analysis revealed clusters of content that affect organizational constructs. B2G relevant clusters are as follows (Table 6.12).

Table 6.12: B2G relevant content for customs

Results of content analysis	
Regulatory framework	
	Provision of calculation schema, subsidy and excise guidelines
Governance framework	
Security framework	
Risk management framework	
Organizational status entitlement	
	Procedural steps for AEO, SEA, and Single Window Access Registration services and processing Approval processing Data lodging and maintenance services and processing
Trade specific activities and dedicated focus on export, import, and transit	
	Process verification and approval Document, certificate, and form provision End-to-end-processing simplification
Standardization requirements embracing	
	Standardized data and message formats Standardized procedures Standardized processes

By revisiting content and organizational constructs involved, linkages aggregate to 21 linkages types (Table 6.13).

Table 6.13: B2G relevant linkage types in customs

Linkage types 1-7	Linkage types 8-14	Linkage types 15-21
1 Accredit	8 Ease	15 Mandate
2 Allow	9 Exchange	16 Prove
3 Check	10 Facilitate	17 Provide
4 Comply with	11 Get access to	18 Release
5 Conduct	12 Give access	19 Require
6 Cooperate in	13 Issue	20 Submit
7 Dispense with	14 Manage	21 Verify

Direction is a relevant element to identify the direction of content transmission. The number of directed linkages and the direction taken give further indication for the relevance of individual senders and receivers. Directions taken are from business to governmental constructs and vice versa. Figure 6.17 illustrates directed linkages for B2G constructs and refers by numbers to linkage types as introduced in Table 6.13 and further detailed in Table 6.14.

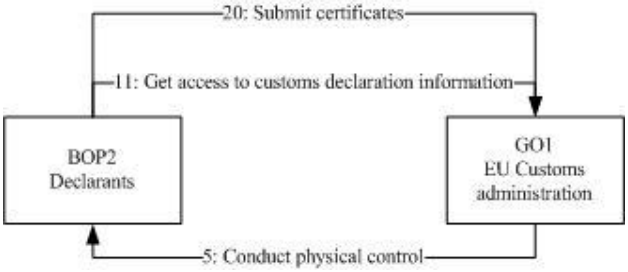


Figure 6.17: Example of directed linkages in the OF

Among 21 distinct linkage types, eight of them direct B2G activities, the remaining 13 direct G2B activities. Table 6.14 adjoins linkage types, content, and direction.

Table 6.14: Directed linkage types and content in customs

Linkage type	Content that is scope of linking business and governmental actors	Direction
1 Accredit	Organizational status entitlement for AEO, Single European Authorization, and Single Access Point	G2B
2 Allow	Simplified customs procedures such as centralized clearance	G2B
3 Check	Trade relevant activities that relate to export from EU Community	B2G
4 Comply with	Regulations for import, export, and transit	B2G, G2B
5 Conduct	Goods control, inspections, declaration verification	G2B
6 Cooperate in	Security concerns	G2B
7 Dispense with	Revised Kyoto Convention	G2B
8 Ease	Customs declaration procedure	G2B
9 Exchange	Data, accompanying documents, decisions, and notifications	B2G
10 Facilitate	Data lodging for Single Access Point	G2B
11 Get access to	Customs declaration related information	B2G
12 Give access	Customs declaration related information	B2G
13 Issue	Simplified administrative procedures, commonly understood definitions of process elements such as import, export, and goods movement	G2B
	Calculation schema for customs value calculation	G2B
	Standardized message exchange and standardized procedures	G2B
14 Manage	Entry point for information flows between trade and government in single window environment	G2B
15 Mandate	Goods and transportation means (containers, pallets, etc.)	G2B
	Information related to goods movement across external Community borders and within EU customs territory	G2B
	Legislation changes such as Modernized Customs Code replaces Community Customs Code	G2B
16 Prove	Origin of goods	B2G
17 Provide	IT application for customs declaration process	B2G
	Information and documentation of import, export, and transit regulatory requirements as well as registration services for trader community	B2G
18 Release	Goods	G2B
	Customs declaration	G2B
19 Require	Information and documentation of import, export, and transit regulatory requirements	B2G
	Regulatory framework to establish common standards (standards include not only IS standards, but procedural and technical standards)	G2B
	SAFE	G2B
20 Submit	Export and import relevant data	B2G
	Certificates	B2G
	Customs declaration related information	B2G
	Pre-departure declaration	B2G
21 Verify	Document, goods, and samples for further analysis	G2B

Figure 6.18 symbolizes the direction of linkage between interacting organizational constructs and which organizational construct is the initiating and which one is the receiving actor. The direction of a link between two organizational constructs is represented with the arrow '⇨' to represent the direction of linkage from the initiating organizational construct in the left-hand column to the receiving organizational construct(s) in the upper row. The arrow '⇦' vice versa represents the direction of linkage from the initiating organizational constructs that are listed in the upper row to the receiving organizational construct(s) in the left-hand column. Resulting from the analysis and as represented with '⇦', certification brokers for example are the receiving organizational constructs, and not the initiating constructs. The UNECE on the other hand is an initiating, rather issuing organization that links with other organizational constructs. The linkage is represented by '⇨'.

	Customs administration EU	Customs administration non-EU	Regulatory authority EU	Regulatory authority non-EU	Inspection agencies	EU Community	Non-EU states	EU-Customs Union	WCO	WTO
Manufacturers	⇨ ⇦	⇨	⇨		⇨	⇨ ⇦			⇦	
Declarants	⇨ ⇦	⇨	⇨		⇨	⇨ ⇦			⇦	
Consignors	⇨	⇨	⇨		⇨	⇨ ⇦		⇦	⇦	
Certification brokers	⇦					⇦			⇦	
Port operators				⇦		⇦			⇦	
Logistics Service Providers	⇨ ⇦	⇦	⇨	⇦	⇨	⇨ ⇦		⇦	⇦	
Carriers	⇨ ⇦	⇦	⇨	⇦	⇨	⇨ ⇦		⇦	⇦	
Consignees	⇨				⇨	⇨ ⇦		⇦	⇦	
Customers									⇦	
Authorized economic operators	⇨ ⇦		⇨			⇦		⇨ ⇦		
WCO	⇨ ⇦	⇨ ⇦				⇨	⇨			
UNECE						⇨	⇨	⇨	⇨	⇨

Figure 6.18: List of B2G relevant directed linkages

The following example of B2G interaction gives details on B2G collaboration between declarants and governmental constructs (Figure 6.19). B2G collaboration in this case contains 14 interactions. Each of the 14 interactions is included in Figure 6.19 by a number that refers to the linkage types of Table 6.13 (see **Table 6.13**). In addition, Figure 6.19 reveals that multiple linkage types are used between business and governmental actors and that linkage types are applied across levels. One example of multiple use is linkage type 11.

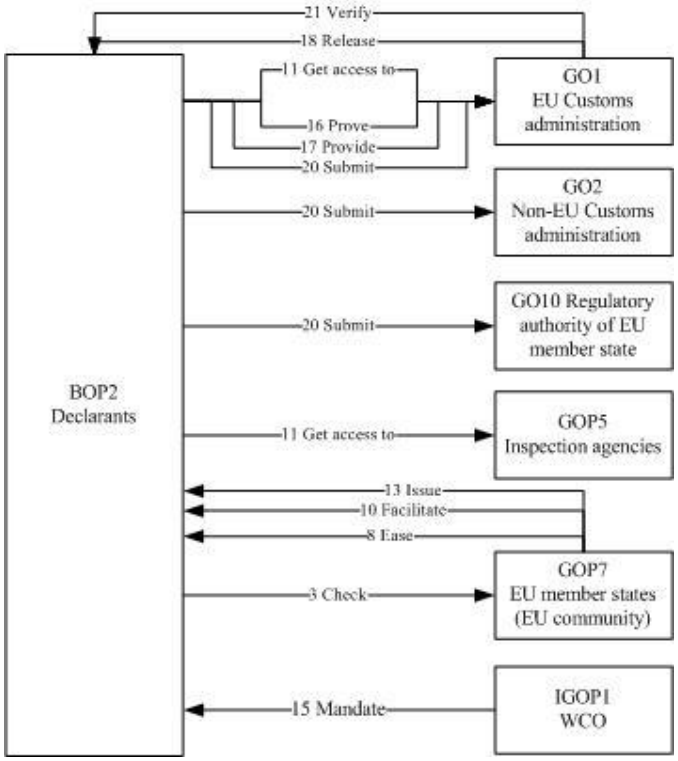


Figure 6.19: Multi-referenced linkage types in the OF

Figure 6.20 summarizes all pairs with linkage types from business to governmental actors. The numbers in Figure 6.20 refer to the numbered linkage types of Table 6.13 (see **Table 6.13**). Figure 6.21 summarizes those pairs directing from governmental to business actors. The numbers in Figure 6.21 refer to the numbered linkage types of Table 6.13 (see **Table 6.13**), too.

From \ To	Customs administration EU	Customs administration non-EU	Regulatory authority EU	Regulatory authority non-EU	Inspection agencies	EU Community	Non-EU states	EU-Customs Union	WCO	WTO
Manufacturers	**11, 17, 20**	**20**	**20**		**11**	**3**				
Declarants	**11, 16, 17, 20**	**20**	**20**		**11**	**3**				
Consignors	**11, 20**	**20**	**20**		**11**	**3**				
Certification brokers										
Port operators										
Logistics Service Providers	**11, 17, 20**		**20**		**11**	**3**				
Carriers	**11, 17, 20**		**20**		**11**	**3**				
Consignees	**11, 17, 20**		**20**		**11**	**3**				
Customers										
Authorized economic operators	**12, 17, 19, 20**		**20**					**9**		
WCO	**17**	**17**				**17**	**17**			
UNECE						**17**	**17**	**17**	**6**	**6**

Figure 6.20: Directed linkage types from business to government

From / To	Customs administration EU	Customs administration non-EU	Regulatory authority EU	Regulatory authority non-EU	Inspection agencies	EU Community	Non-EU states	EU-Customs Union	WCO	WTO
Manufacturers	**5**					**8, 10, 13**			**15**	
Declarants	**18, 21**					**8, 10, 13**			**15**	
Consignors						**8, 10, 13**		**13**	**15**	
Certification brokers	**5**					**13**			**15**	
Port operators				**19**		**13**			**15**	
Logistics Service Providers	**5, 4, 18, 19**	**19**		**15**		**6, 4, 10, 13**		**6**	**15**	
Carriers	**5, 4, 14, 18, 19**	**19**		**15**		**6, 4, 10, 13**		**6**	**15**	
Consignees						**8, 10, 13**		**13**	**15**	
Customers									**15**	
Authorized economic operators	**18**					**10**		**2**		
WCO	**4**	**4**		**7**						
UNECE										

Figure 6.21: Directed linkage types from government to business

Linkage types and content so far did not reveal how they transmit content and which means are used to connect organizational constructs. The analysis of linkages detected diverse media that ease and consent the transmission of content. Governmental constructs refer to electronic means and add them directly to regulatory sources. Others refer explicitly to SAFE as in case of the US Government (an instance of GO11). In addition, there is a high occurrence of descriptive means and form-based processing to transmit content (Table 6.15).

Table 6.15: B2G relevant medium types in customs

Medium types	Assigned content
Physical	Goods inspection, sample control of goods, documents, and traders (mostly affecting BOP2-BOP9)
Paper-based (form)	Documents and certificates
Electronic (IT)	Data and form processing

Medium types excluding physical control of goods have either a descriptive or standardized format. B2G applies a combination of structured (standardized) and unstructured formats (Table 6.16). Detailed specification of for example standardized data and forms are part of inter-governmental conventions (WCO SAFE) and regulatory requirements such as C-TPAT.

Table 6.16: Format of medium types

Medium type	Format of medium type	Examples
Paper-based	Descriptive (text)	Regulations, procedures, and processes
Paper-based Electronic	Standardized, not specified	Procedures and processes, data formats
Electronic	Standardized, specified	WCO Data Model, forms relevant for Certificate of Health, Certificate of Origin, or C-TPAT

6.4 Findings and Learnings from the 1st Design Round

6.4.1 Introductory Notes

The analysis of organizational and institutional constructs and their further usage for the B2G Procedure Model leads to a number of key findings. The structure of this section is as follows. For each of the core findings a sub-section introduces findings, clarifies

modeling results, and point to elements relevant for the procedure model. This section therefore serves twofold: proving the applicability of AFII and the conditions applied to the usage, as well as constraints and assumptions needed to overcome non-B2G relevant dependencies. The remainder of the chapter is as follows. In Section 6.4.2, organizational constructs are in focus based on the following characteristics: bundling of actor roles, the inclusion and relevance of organizational constructs in collaborations due to status changes as observed for example in the AEO status concept and furthermore the role and relevance of inter-governmental actors in B2G collaborations.

Section 6.4.3 focuses on linkages as institutional constructs. It assesses the number of interactions that relate to a B2G collaboration from multiple viewpoints. The role of inter-governmental influence is a further topic in this section. Finally, the section concludes with an elaboration on publicly shared processes in B2G.

Section 6.4.4 elaborates the role of institutional forces as institutional constructs. Firstly, it assesses the motivation for institutional change and its influence on B2G collaborations. Secondly, it discusses the timing and organizational allocation of regulations. Thirdly, it covers the impact of competing and / or conflicting institutional forces on B2G collaborations.

Next to linkages and institutional forces, Section 6.4.5 discusses the role of medium types in B2G collaborations.

Further remarks on findings and learnings are subject to Section 6.4.6 that concludes this chapter.

6.4.2 Organizational Constructs

The assessment of organizational constructs revealed the following.

- Bundled assignments of actor roles

Analytical sources apply the terms ‘trader’ and ‘trader community’ differently. Some texts adhere to those actors that trade, excluding actors that manufacture or purchase goods. Others refer to trader communities that are involved in export and import, but not transit activities. The unclear assignment of who is acting on behalf of whom and for which purpose led to the following assumptions: a trader (or trader community) is any of BO2, BO3, BO4, BO5, BO6, BO7, BO8, and BO9. Aggregation levels BOP1 to BOP9 refer to traders and trader communities accordingly if references point to more

than one trader or trader community. Trader and trader community specific references in the text therefore subdivide into eight distinct pairs of collaboration.

The assignment and duties of a manufacturer (BO1) is resolved as follows. In case a manufacturer trades on his own, he performs trade specific activities as ‘declarant’ (BO2) and acts then as BO2. In case he appoints a logistics service provider (BO7) to fulfill trade relevant activities, the collaboration and therefore institutional forces add BO7 to the collaboration model.

- Inclusion of organizational constructs and the point of view

Business constructs in particular customers (BOP10) are rarely part of regulatory sources, unless goods control or certification routing from customer to manufacturer are legally binding from a national legislature perspective. Other examples refer to certification brokers (BOP5) and chambers of commerce (BOP4). Though the study revealed the need for the inclusion of BOP4 and BOP5, they disappear in regulatory sources and therefore in the modeling result.

- Status acknowledgment and certification based concepts using the example of AEO

Global conventions and local legislation aim to implement a certification concept that standardizes registration information. Examples are Single European Authorization and AEO. Legislation covers pre-formatted process steps that apply to multiple organizational constructs for AEO. Regulatory authorities acknowledge any trader to become AEO-certified if it fulfills certain conditions. Examples of expected conditions are organization registration, risk based financial and trade status, and positive review results from customs authorities. The AEO concept does not refer to EU member states solely. The initial concept originates from WCO, and adheres to any WCO member. AEO requirements do not differ among WCO members. Once implemented, regulatory authorities prospect that AEO is applicable to any business organizational construct involved in any export or import process activity (Figure 6.22).

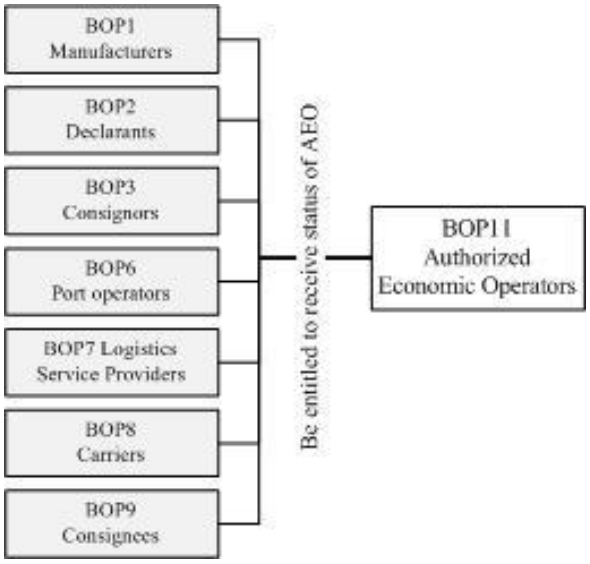


Figure 6.22: Effects of AEO on business constructs

Within the deployment phase, AEO results in streamlined operational activities. In the above-depicted figure, BOP11 represents the AEO-certified trader population and aggregates distinct populations under the mandate of being AEO-certified (Figure 6.22). Still, organizational populations as for example the organizational population certification brokers BOP5 are not aggregated to BOP11. One of the reasons is that regulatory sources do not point to the role or involvement of certification brokers in the AEO-certification program. Further organizational populations will not be aggregated to BOP11 if they do not fulfill the criteria to become AEO-certified. As depicted in Figure 6.23 BOP5 exists then as a separate construct in the B2G collaboration. The case study observation confirmed the lack of clarity concerning the role of certification brokers. Governmental and business participants expressed an uncertainty about the level of detail issued to specify AEO requirements and inclusion.

There are further regulatory sources to be assessed that might vary among AEO-certified organizations as for example a manufacturer as part of BOP1 needs to fulfill further regulatory requirements than a service provider that belongs to the group of BOP7. The aggregation to AEO-certified traders is feasible if pre-formatted process steps contain standardizable process elements, disclose and resolve process gaps, and ease process harmonization among those organizational constructs that become AEO certified. Throughout a thorough collaboration analysis, the concept of AEO-certification will reveal the commonalities among actors and facilitate the procedural alignment of business constructs with governmental constructs in a uniform manner (Figure 6.23).

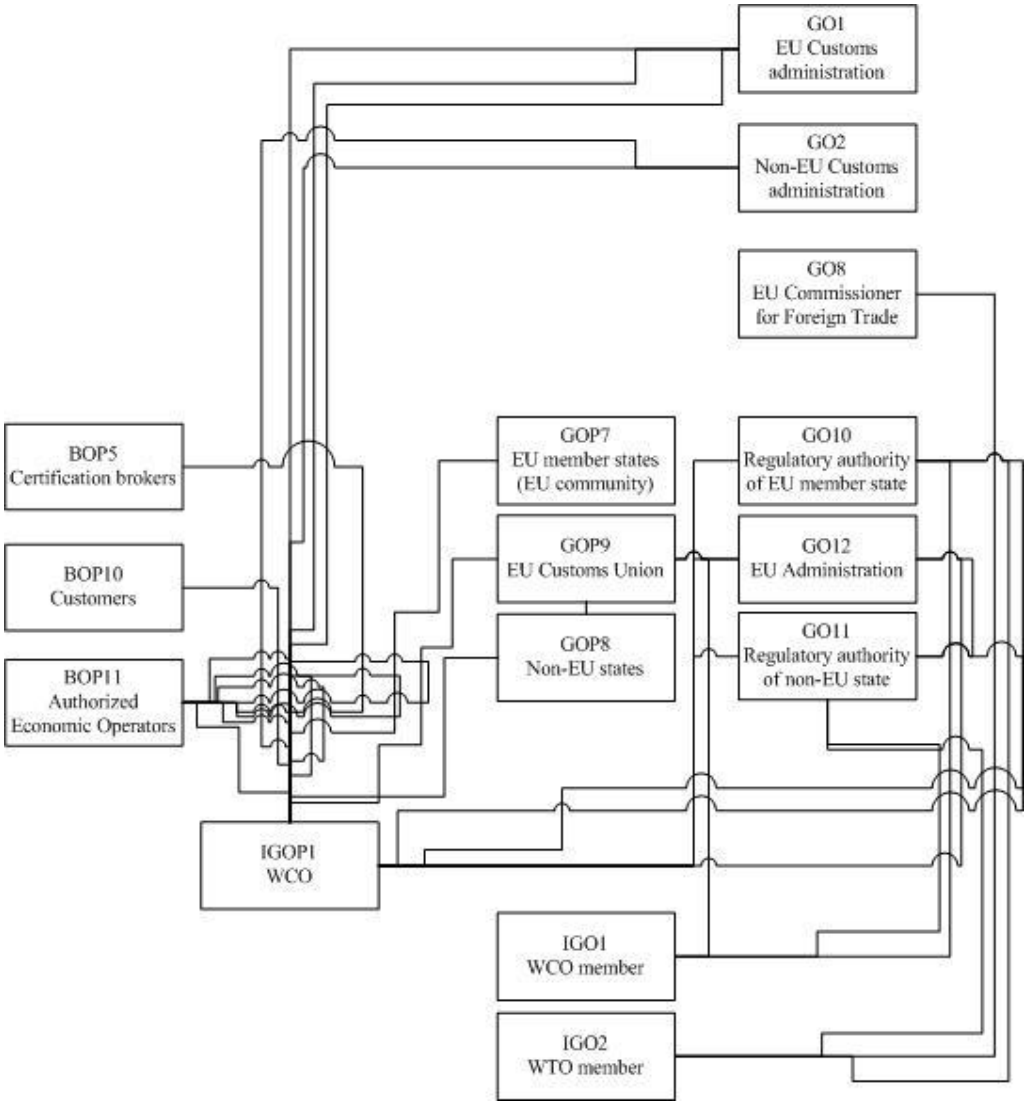


Figure 6.23: AEO-facilitated alignment in B2G

- Role of inter-governmental actors in B2G

Related work (cf. Scott (2001), p. 136) and the study point to the importance and role of inter-governmental actors such as the WCO. To gain better insight on the role and purpose of inter-governmental constructs, they were included in the analysis and modeling activities. The findings are the following. Inter-governmental constructs (IGOs, IGOPs) consist of governmental institutions. Governmental institutions participate in IGOPs based on dedicated purpose, role, and scope of activity. Customs territories for example represent national authorities in the WCO. Trade relevant activities and the work on trade agreements relates to the WTO, which consists of governmental constructs as for example EU member states and individual countries. Furthermore, regulatory sources point to inter-governmental constructs when describing

B2G activities. This leads to collaborating pairs of IGOPs to BOs and BOPs. The role of collaboration between GOs, GOPs, and IGOs or IGOPs concerns intra-governmental as well as non-governmental activities. Though having agreed upon, IGOs and IGOPs in general do not execute conventions. Execution and local transposition is subject to each of the members of an IGOP.

Based on these findings, the B2G modeling adheres to IGOs and IGOPs as follows: in case governmental sources connect IGOs and IGOPs directly to business constructs, interactions are included in the modeling. In case IGOs and IGOPs are not directly referred to, interactions and content serve as secondary input. The latter case is not part of the modeling, unless dependencies on B2G level reveal a need for inclusion.

- Relevance of organizational constructs and the point of view

Business constructs, in particular customers (BOP10), are rarely mentioned in regulatory sources, unless goods control or certification routing from customer to manufacturer are legally binding from a national legislature perspective. Other examples refer to certification brokers (BOP5) and chambers of commerce (BOP6). Though the study revealed the need for the inclusion of BOP5 and BOP6, they disappear in regulatory sources and therefore in the modeling result.

The distinction between business and governmental constructs in the modeling approach proved right. The distinction facilitated the alignment of B2G collaboration scenarios to B- and G-organizational constructs. In addition, it supported the argument that business and governmental domains are equally weighted. The aggregation of BOs to BOPs is applicable, as operational manuals are made available, for example through ISO-certification processes, ERP-implementations, and B2B standards that address industry- and role-specific activities.

On the governmental side however, the aggregation of GOs to GOPs was rarely used in the design process. The organizational embeddedness of customs administrations (GO1) differs from country to country. In case of the Netherlands, for example, Dutch Customs and Tax integrated customs and tax relevant processes operate as one organizational construct. Simplified customs procedures in the Netherlands look differently than in Denmark. Local requirements, national differences, and differing details on operational level, dissent an aggregation of GO1 to GOP1. The modeling as such did not experience a slowdown or disadvantage from missing aggregation levels.

6.4.3 Institutional Constructs: Interactions

The modeling explored the following on interactions.

- High number of interactions that relate to B2G collaboration from B2G and vice versa

The modeling approach indicates mostly referenced actors in B2G. The intensity of interactions points to coordination efforts between organizational constructs. In the case of G2G collaboration, the number of interactions among GO1, GO10, and GOP7 indicates high coordination efforts resulting from supranational legislation and procedural modifications that address any EU member state (MASP and Modernized Customs Code).

- Inter-governmental interactions with business and governmental constructs are part of national and supranational legislation.

B2G interactions base on G2G collaboration results. The review of G2G and IG2B relevant interactions illustrates the dependency of local legislation from external sources, transposition ratio, and clarity of regulations, and potential conflicts (Figure 6.24).

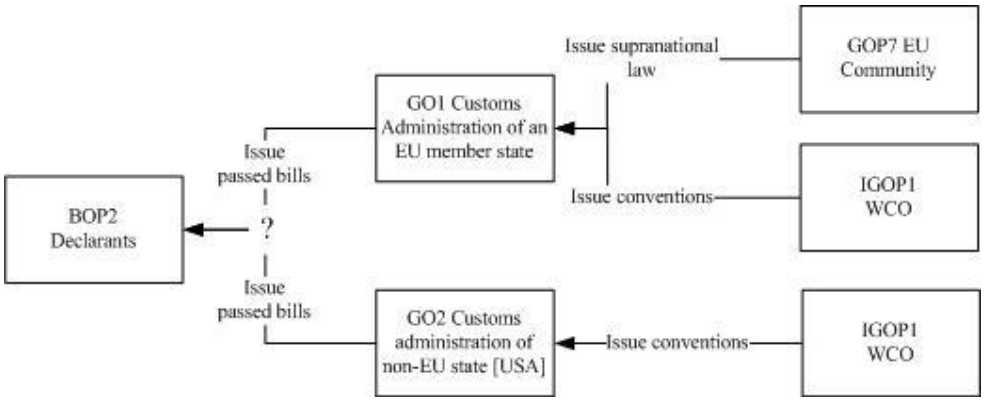


Figure 6.24: Relevance of indirect linkages for B2G

This work assumes that regulations passed legislature and that passed bills do not contradict other national legislation. The possibility of encountering ambiguous conditions of legal acts is not anticipated. The B2G Procedure Model presumes that modelers conducted a simulation of legal reasoning. Research on ambiguity in legal acts and refactoring potential are subject to intra-governmental modeling and government-to-inter-governmental collaboration. An outlook on legislation modeling illustrates linkages between governmental constructs and content to be transmitted (Table 6.17).

Table 6.17: Extract of intra-governmental linkages

Source: cf. Otto et al. (2007), p.7-8

Linkage types	Linkage content
Classify regulations	Classified regulations Meta model of regulations
Prioritize regulations, exceptions, and relationships	Legislation hierarchy and structure
Transform meta model into data dictionary and glossary	Data dictionary and glossary
Verify legal concepts and compliance	Regulation audit

- Publicly shared procedures in B2G

Linkage content as depicted above addresses those elements that are publicly shared. With this respect, linkage types and content form public process elements and adhere to the concept of public processes. Contrary to that, intra-organizational processes for example refer to privately assessed, intra-governmental procedures. Private processes remain private unless disclosure is required. That is the case if external experts contribute to process analysis as in the following example: inter-governmental organizations provide external input to discuss impact of 100% transposition of SAFE into national legislation. The procedure model will assess public process characteristics to decide upon pre-requisites for the usage of public processes.

6.4.4 Institutional Constructs: Institutional Forces

The modeling concerns institutional forces as follows.

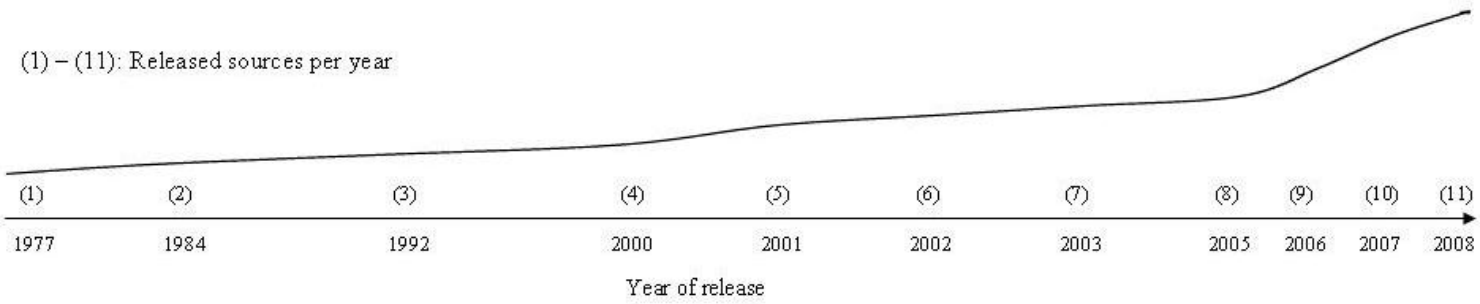
- Motivation for institutional change and therefore B2G

Motivation for institutional change is anchored directly in regulatory sources and supplementing material. The Modernized Customs Code text includes a section with arguments about the abolishment of the Community Customs Code by the Modernized Customs Code. The rational behind that change is promoting international trade and safer trading needs, as well as enabling swift and efficient clearance of goods. Sources cite international trade statistics referring to increased customs processing because of prospected economic growth and increasing volumes of imports and exports. The number of customs declarations processed per year is a good indication of cross-border trade activities. To-date 175 Million customs declarations are processed yearly resulting

in 333 customs declarations per minute (cf. Kuhnen (2009), p. 3). If processed slowly, purely paper-based, or error-prone between business and governmental actors, trade activities slow done because of waiting time at the border and higher efforts for post-processing of paper-based documents and forms. Less modern conditions as those described above hamper market entry and weaken business performance.

- Timing and organizational allocation of regulations and conventions' issue

In the following, a timetable of selected material and regulations illustrates the number of regulations and material in the period of 1977 and 2008. The timescale in the figure applies the release or publication dates of regulations and accompanying material. The overview given in Figure 6.25 is an extract of released sources of regulations and material and does not claim to be complete. The alignment of release year and number of sources demonstrates an increasing number of regulations and material released in the past decades.



Key to Chart: Released sources per year

(1) 1977
- Articles 7(3) and 10(3) of Council Directive

(2) 1984
- International Convention on Frontier Controls
- Regulation on Community Customs Code

(3) 1992
- Council Directive for Excise Duty

(4) 2000
- Revised Kyoto Convention
- C-TPAT US Customs-Trade

(5) 2001
- Communication on Customs Union

(6) 2002
- Communication on e-Europe
- Council Resolution on paperless customs and trade

(7) 2003
- Communication on e-Government

(8) 2005
- Regulation on Modernized Customs Code

(9) 2006
- Single Window released by distinct sources: WCO, UNECE, and Modernized Customs Code

(10) 2007
- WCO SAFE Framework of Standards
- US Law and 100% Scanning Recommendations
- Single Window from Russian perspective
- Authorised Economic Operator
- Single European Authorization
- Standardised Framework for Risk Management in Customs Administration

(11) 2008
- SAFE versus 100% Scanning
- 100% Cargo Scanning: The WCO Position
- 100% Scanning: The European Strategy

Figure 6.25: Timetable of issued regulations and material

The exemplified alignment concludes the following. The institutionalization of the Modernized Customs Code reveals a long period and a number of elaborations that are needed to refine and detail regulatory decisions. The organizational constructs in that context that triggered institutional change are as follows.

- EU-national regulatory authorities transpose supranational law into national law and adopt non-governmental conventions
- Any national regulatory authority adopts non-governmental conventions into national legislation and passes national bills
- Non-EU regulatory authorities issue local regulations that are legally binding to foreign business organizations if they conduct trade with local organizations
- Non-governmental institutions like WCO and UNECE issue recommendations for business and governmental constructs in the form of conventions. Dependent on the transposition level, recommendations transform into legally binding forces or are subject to apply voluntarily
- Customs administrations that describe on a national basis trade and customs activities, addressing those to any business organization involved in trade
- Inspections agencies supervise, control, and audit physical and form-based requirements on behalf of regulatory authorities

Hence, the institutional change in customs driven B2G collaboration as enforced by regulatory power years ago is being observed years or even decades later (cf. Reimers & Li (2008), p. 3-4).

- Competing institutional forces

Inter-governmental forces such as the Revised Kyoto Convention and UNECE guidelines complement, add, or influence B2G constructs. An example of indirect linkages from IGOP1 and IGO3 to customs administrations illustrates the flow of fully or partially transposed data elements from IGOP1 to customs administrations (Figure 6.26). Directions address one or more organizational constructs in both or one of the directions. The format of directions is ‘from → to’ as illustrated below. Multiple regulatory sources therefore compete in becoming applied by business constructs. Business constructs on the other hand experience higher effort in the alignment to both or multiple regulatory requirements.

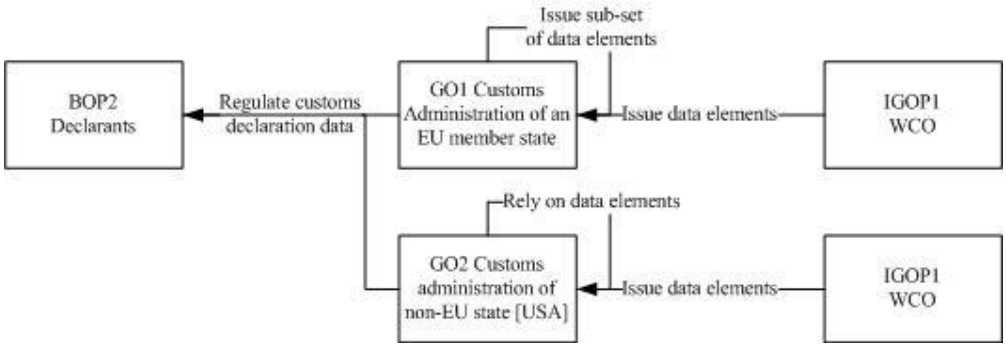


Figure 6.26: Competing institutional forces

- Conflicting institutional forces

In case of export, regulatory impact on national level derives from national and external sources. External sources are for example supranational and foreign national sources (IGOP1, IGOP2). The 100% scanning directive affects European and further trade activities because it contradicts regulatory requirements on security measures prescribed by EU legislation (Figure 6.27).

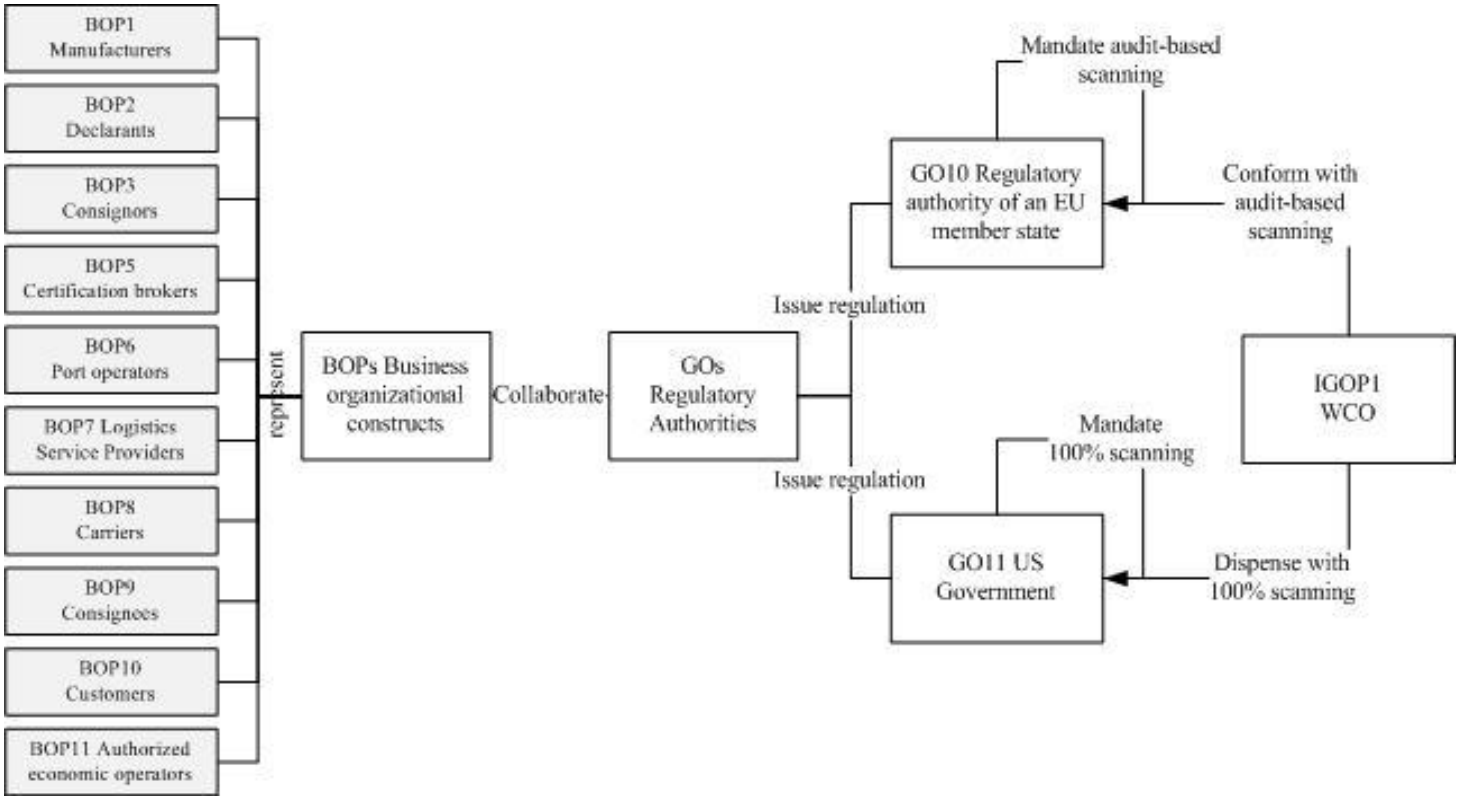


Figure 6.27: Conflicting regulatory requirements

Traders that export to the USA need to scan any cargo as security measure. Trade shares from Table 48 show the importance of complying with US national regulations to European traders. The USA is the top export partner of the EU member states. Non-compliance with US national regulations will hamper market entry and trade. EU legislation accredits a combination of scanned cargo and risk assessment as sufficient security measures. 100% scanning requires technical equipment and skills to be installed and maintained by actors involved in any US-targeted export. Following the example of the 100% scanning directive, transposition from the Revised Kyoto Convention, issued by inter-governmental constructs (IGOP1), transposes to regulatory authorities (GOP7, GOP8) in different grades. GOP7 transposed the General Annex but not the Specific Annexes that detail procedural activities between business and government. Table 6.18 outlines effects of G2G activities on B2G with legally imposed contradictions.

Intra-governmental conflicts occur especially in case if members of inter-governmental institutions participate in international conventions and agree upon certain content, and disagree in the grade of transposing those. The analysis reveals further discrepancies within governmental constructs.

Table 6.18: Conflicts in regulatory sources and conventions affecting B2G

G2G caused effects on B2G	Impact on B2G activities related to linkage type and content 'conduct security measures'
US Law "Implementing Recommendations of the United States 9/11 Commission Act of 2007"	Mandate 100% scanning security measure for goods and transportation means such as containers Impact administrative, financial, and physical cargo activities
Modernized Customs Code (2005) Standardized Framework for Risk Management in EU Customs Administrations (2007) Single European Authorization (2007)	Conduct physical goods control, inspections, declaration verification Mandate risk analysis and audit-based controls Conduct physical control for high risk transactions and conduct non-physical audit-based controls Share risk management framework within G2G
Revised Kyoto Convention (2006)	Apply risk-based analysis from SAFE for physical controls

6.4.5 Institutional Constructs: Medium Types

Besides legally imposed institutional forces, governmental constructs name technical forces as key motivators for institutional change. Regulatory texts reference them directly. The main arguments for recent regulatory changes are the emerging role of IT in being a key element in ensuring effectiveness of customs controls and trade facilitation. Externally caused security needs reinforce the need for IT-enabled support.

They result from safety threats and susceptibility to corruption. The emerging role of IT is apparent in a number of B2G collaboration scenarios. Recalling the reference process from the previous chapter, linkage types apply to activities and content that organizational constructs conduct, submit, release, or provide ideally in an electronic and standardized format.

Governmental constructs distinguish technical forces based on the purpose they are used for. They suggest electronic, standardized, and form-based formats for linkage types that refer to data processing, submission of certification relevant information, and actor registration. Other formats are descriptive and textual.

In the Modernized Customs Code and supplementing material, they refer to IT by addressing different terms such as ‘tool’, ‘eCustoms’, ‘electronic certificates’, ‘standardized message exchange’, and ‘facilitate data lodging’ (cf. European Commission (2005c), p. 18-20). Previous findings in the study coincide with the role of IT in institutional forces. The argument for passing the Modernized Customs Code prospects higher benefits for customs management through IT-enabled data, document, and business processing. Regulatory constructs such as the European Community and further regulatory authorities see a need to build IT capacity in B2G collaboration as well as intra-governmental activities.

The analysis allocates IT as a medium that enables the transfer of linkage content from one or many organizational constructs to other organizational constructs. Though the need of IT is clear, standardization details and IT specifications are missing. Table 6.19 outlines the level of detail existing to-date and points to missing details in the Modernized Customs Code.

Table 6.19: IT relevant details in regulatory sources

B2G relevant sources of information on IT	Level of detail	Missing details
Annex 2 - Electronic customs systems and projects, 2007 Yearly Revision (European Commission (2007a))	Annex 2 lists any e-Customs projects that are included in the Modernized Customs Code and references to regulations. Project list contains per project motivation of project, scope in descriptive format, timeframe and implementation milestones. Project list cross-references to further project activities and projects.	Details concerning IT architectural guidelines, core elements of IT applications envisioned, data models, references to business blueprint and further technical documents are missing. Annex 2 and cross-referenced regulations delegate IT relevant implementation details to national regulatory authorities.
Annex 3 - Governance Scheme for the Implementation of Electronic Customs (European Commission (2006a))	Annex 3 lists a governance scheme including a program management charter that supervises, coordinates, and advices national IT initiatives following the timeframe set in place by Annex 2	The role of the program management committees covers informing and consulting on legal aspects. IT related program activities are not included.
Trade Information and Consultation Frame for Electronic Customs (European Commission (2005d))	The document describes a governance scheme that includes trade experts. In addition to Annex 3 it specifies in which format and how often trade and customs group meet.	IT specific activities are not included. The role and inclusion of IT experts are missing.

Within the project plan of the European Commission, detailed in Annex 2, the project elements that are described encompass legal objectives and advantages, milestones that are estimated for the completion of the IT implementations, the corresponding legal basis, and further dependencies (cf. European Commission (2007a), p. 5). More details on activity and task level as well as the detailing in roles and responsibilities are missing. With respect to those sources of references publicly available for this work, there is still the possibility that further details are available within the Commission. Recalling the insights brought in by the participants in the case study, there is a substantial lack in the level of detail: despite the increasing number of supplementing material provided to governmental and business constructs, the level of detail in IT matters remains high-level and rather focused on the overall need of IT inclusion. Semantic unambiguous terms and standardization guidelines are missing. National authorities and business constructs in the study reflected on that lack of detail. They were critical about the effect of implementing IT applications from a national, isolated perspective. A concerted IT program management is missing.

The gap between high level and rather descriptive IT needs and the need of detailed IT-relevant specifications anticipates 27 different versions of IT applications that served the same purpose and scope. MASP relevant applications are comparable in geographical and user spread with the New Computerized Transit System (NCTS). Any customs administrations of the European Union and EFTA states apply NCTS for intra-market trade. NCTS related specification work started already in 1997. The final milestone and project closure of NCTS is scheduled for July 2009. Thus, the specification and implementation phases lasted around 10 years. Compared to that timeframe, Annex 2 of the MASP plans an implementation phase of around 5 years for the EU member states and business actors. A detailed analysis on NCTS reveals that it applies solely EDIFACT messages and does not fulfill interoperability measures (Lemm (2008)). The inclusion of the General Annex of the Revised Kyoto Convention into EU relevant regulations is an attempt to provide clearer and more detailed specifications. The General Annex includes principles for customs processing and the use of information technology.

There is no doubt about the importance of IT inclusion in regulatory sources. Concerning sufficient details to prevent uncertainty about IT architectural elements, institutional forces need to include them. Once included, actors require sufficient and unambiguous details to implement required applications. The procedure model will assess business standard characteristics to decide upon pre-requisites for the usage of standards in B2G. So far, the medium types are the least assessed in the reviewed legislation sources. Medium types lack references to semantics, commonly terminology, or syntax provision. With respect to form-based and standardized documents, the Single Administrative Document (SAD) is one of the rare examples that contain data elements and descriptions and that facilitates customs processing for a customs administration of an EU-member state (GO1). The exchange of SAD content so far is still not fully standardized and lacks common semantics.

6.5 Observed Expectations on Standards in B2G Collaborations

6.5.1 Introductory Notes

According to standards experts, little evidence on standards-related effects in the design of real-world B2G collaborations has been revealed in the first round of the design in Chapter 6. This section focuses on feedback and comments that have been raised by

stakeholders, respectively standards experts along the first round of design of the B2GPM. It evaluates the fit of the procedure model with the real-world setting and complements the findings of Section 6.4.5.

The remainder of the section is structured as follows. The data collection is based on interviews and informal discussions. A semi-structured questionnaire collected data in the field of standardization (see **Table A.9.7**). Interviews with collaborating actors took place in the assessment of the real-life settings for each of the observed trade networks. Interviews with standardization experts covered types and roles of actors involved in standardization, their point of view on standards and the standard development process, as well as criteria to drive adoption of a standard under which condition(s). Interviewees are active in standardization organizations in Germany, Denmark, The Netherlands, Canada, U.S.A., and Switzerland. All of them are involved in UN/CEFACT or other SDOs. They are in charge of standardization from either a business or governmental point of view. Supplemental interviews covered business and governmental actors that are in charge of B2G collaboration activities in export and that are active in the reference framework (Table 5.5). In addition, research in this work included discussions with and observations of the listed business and governmental actors. Tables A.9.8 and A.9.10 (see **Table A.9.8** and **Table A.9.10**) contain an anonymous list of participants in the interviews and observations. Further interviews took place in Denmark, The Netherlands, Ireland, and Finland. Two aspects are benefiting from the approach of introducing contextual information, opinions, and facts from the interviews: 1) the input is presented unbiased of theoretical considerations and definitions. An example of this is that understandings of the term standard as expressed by the interviewees are accepted as valid even though the term or explanation does not necessarily fit more formal and academic definitions. An attempt is however made to accept that interviewees and herein practitioners have different understandings of terms compared to researchers. 2) The variety of stakeholders (see **Table A.9.8**) and cases (see **Figure 3.3**) are illustrated in an a-theoretical manner. The implication of this approach is that other than researchers can also follow the cases and the design of the B2G Procedure Model without knowledge of any theoretical assumptions and constructs. This procedure is in line with the practice driven research strategy (cf. Zmud (1998)). The section concludes with an evaluation of the observations. Where useful and relevant it points to related work.

6.5.2 Reflection on the Definition of IS standards

Being asked to define IS standards (henceforth standards), respondents referred to standards as “clear, concise, repeatable sequences of events or specifications that are broadly adopted and implemented“. A significant buy-in from a broad set of constituents in industry, user community, and government is a further key characteristic of IS standards. One expert emphasized that the consensus to be reached in a standard development among involved parties is comparable to what is needed to agree upon a commercial contract. Standards fulfill their purpose if they enable interoperability. Standards need to provide semantic unambiguity and integrate process and application areas.

One respondent referred to the standard definition of IEEE (cf. IEEE Standards Association (2009), p. 1) by which “standards establish an authoritative common language that defines quality and sets technical criteria. By guaranteeing consistency and conformity through an open, consensus setting, IEEE standards add value to products, facilitate trade, help drive markets, and ensure safety.“ Compared to the definition of IS standards that set the pace in this research, IEEE’s membership and accessibility to IEEE standards are not free-of-charge. In addition, the type of membership determines the voting power an individual or organizational member has. The voting power yields the board structure of IEEE and influences directions in standard development. Resulting from the characteristics IEEE standards were not considered as global worldwide accepted standards and furthermore to be used to analyze the applicability of IS standards in the context of B2G collaborations for this work.

Further characteristics of standards recalled economic and network effects. Respondents expected standards to be broadly adopted, implementable, and maintainable for long-term usage. Accessibility of standards is independent from vendors, and provided to any user and industry. Concerning economic effects one respondent referred to additional financial benefits resulting from savings in interface and data exchange development and deployments. Financial savings in two responses related to higher process efficiencies and faster ramp-up of those organizations that implement new business processes in the field of e-Government implementation projects. Organizations then are able to implement process templates that build upon common semantics and data structures.

6.5.3 Reflection on Actors that Demand, Design, and Deploy Standards

Responses about actors involved in standard demand and design confirmed the diversity of actors: business, governmental, and standardization bodies. With respect to the driving forces behind standardization, the respondents referred to the following.

Academic partners are relevant in their role of conceiving standards. Industrial actors are more active if they have market dominance. Small and medium-sized enterprises are less engaged in standardization than multi-national companies are. Besides being individually active, companies delegate their interests to trade and industrial associations. Governmental authorities are recognized in their role as standardization bodies. The German coordination unit at the Ministry for Inner Affairs for example coordinates standardization efforts within and among ministries on federal, regional, and community levels. It provides technical specifications, interface descriptions, and a methodological background to the user community. The organization unit aims for a high degree of uniform interfaces, architecture, and methodological input proposed to the governmental units. Business actors act differently based on the size of the company, not the industry they focus on. Respondents commented on the rather small number of SMEs that are involved in standardization. According to the respondents, SMEs seek rather guidance and an easy access to standards than joining the group of standardizers and developing standards. One respondent pointed out that developing countries similar to SMEs are rather not involved in standardization. The latter aspect coincides with an observation of a member of SDOs that developing countries seek guidance of early adopting countries and confide on the standardization results to adopt them.

Respondents from USA, Canada, and Germany proposed governmental institutions as driving forces of standardization and more concretely expect regulations to enforce standards. One key argument to let regulations drive standards was the dedicated focus the industry has to foster self-interests. The industry is perceived as not being open to reaching out for universal, non-industry specific standards. The chemical sector for example develops standards for the global chemical industry and focuses on electronic messages, data and process exchange for chemical companies and their trading partners. Though trading partners do not necessarily operate only in the chemical sector, the terminology and specifications they need to apply to collaborate with chemical industry partners follows the industry specifics. Governmental actors on the other hand are not in favor of one particular industry or organization and regulate for a broader user community. One respondent provided a counter-argument stating that industries are the ultimate consumers of standards and therefore steer the content and design of standards:

“Industry should be the champion, and spearhead the standards bodies for most if not all items related to IS standards“. The respondent continues, “governments, and their departments, should have knowledge of work in progress, since the evolution of the standards may have a direct impact on the government business as well. Government […] should participate [in standard design and development] wherever there is a good fit for the work to be done“. Another expert compared European and U.S. American perspectives in treating standards requirements: “in the US, regulations are much like standards in the way IT treats them – a requirement. In the EU, they talk more about interoperability but the results are no different“.

Diverse actors are involved in the deployment of standards similar to demand and design. Business actors conduct tests and advance standards in real-life environments. They account practicality and usefulness of standards as important. In case governmental actors, industrial and trade associations promote standards, these actors accord then credibility and herein promote standards. Regardless of the types of promoted standards, technical, semantic, or interface-focused, if disseminated further, they attract further users, which increases network effects. Sharing best practices helps to foster the use of a standard and ease its deployment. One respondent pointed to the role of governing the deployment of standards: Industry should “provide solid implementations for standards and […] be a real-world checkpoint for the many academic standards that various groups proclaim to be useful”. Business actors, namely software providers, set checkpoints in place. Furthermore, an expert pointed to the benefit of standards once being implemented and that they “promote and educate the domain […] in terms of leveraging standards to improve business execution“.

6.5.4 Reflection on Influencers on Standard Development and Evolvement

One question that was raised in the research study referred to influencing factors that steer adoption and evolvement of standards or limit adoption and hamper the use of standards. Overall respondents acknowledge a large user community, which leads to a high adoption of standards. Details in the responses differed. One respondent stressed the number of implementations as success criterion to measure standards influence. Furthermore, the role and experience of users according to the respondent are not influential to the evolvement of standards. Contrary to that, a second respondent pointed to the feedback of users steering development potential of standards and resolving implementation issues. Another respondent described standards’ evolvement as slow and painful. The main reasons are the conflict of becoming “properly placed with the

standards organization and having a vendor hat in case of software vendors". Recalling the standard development lifecycle, UN/CEFACT and other SDOs defined the following minimum required steps in the Open Development Process (ODP)[4] (Figure 6.28).

Figure 6.28: Standard Development Process

Respondents focused on four ODP sub-processes: agree, specify, verify, and publish. An agreement is an identified need for standard development and consensus reached among the ODP participants. Standards operate independently from technologies and software providers. Specifications should embrace specification drafts and examinations. Verifications should better outline test cases and the communication of the test results. Industry serves as a living laboratory. With respect to standards, publishing a number of respondents rated the promotion of standards and voluntary, unenforced offering of standards to the public as important. Furthermore, successfully published standards find an entry in software features and applications. Both trade associations and governmental actors encourage the usage of standards. Governmental actors in addition provide law enforcement for citizens and business. Participants in SDOs confirmed the demand for standards directives. Two respondents referred to an explicit example of a standard directive in Germany: the Public Standard Development Framework of the German Standard Coordination Group, called XÖV-Framework is part of the German standardization offering for e-Government (Salomon & Dietrich (2008)). XÖV stands for "XML in der Öffentlichen Verwaltung" (ibid.).

The responses in the questionnaire revealed heterogeneous viewpoints on the ownership of standards in case a standard is being provided by software providers. The original statement was to rate if and to which extent "standards are proprietary provided by software providers". The statement so far was interpreted differently. It led to the assumption that software providers promote their own standards only. The statement could also be read as meaning that standards are promoted better or faster if software providers apply them in software applications. A third viewpoint was taken that

[4] The original ODP of UN/CEFACT separated review activities into ODP 4 Review Internally and ODP 5 Public Review. Those merge in this work to ODP 4 Review.

proprietary standards are “more effective and much broader adopted than standards provided by standards organizations that have never been implemented“. More clearly, respondents confirmed the role of standards as a mean to integrate organizations, being a common good, and the need to be open and freely accessible. One respondent stressed the role of governing intellectual property for software providers.

According to the respondents, factors that limit standards usage in B2G collaboration are personal interests of organizations that are in conflict with the standardization interest of the collaborating community or in conflict with the industries involved in standardization. Respondents raised concerns about implementation efforts of standardized solutions that affect their internal operations as well as preceding and succeeding actors in the trade chain. Implementation-intense standards hamper their usage and result in a smaller and therefore less attractive adoption base. Concerning the influence of interests, particular interests are also apparent if organizations boycott standards. Software providers that benefit from rejected standards are able to offer proprietary interface solutions and increase their market share. Obstacles result in higher efforts to establish and maintain the integration of public processes and data exchange, similar to using EDI. Further factors that influence standards usage depend on the quality of standards and the way to measure quality.

6.5.5 Reflections on Influencers that Steer Acceptance or Failure of IS Standards

Along the assessment of trade networks, discussions and viewpoints transcripted in the research study added greater detail about the success or failure of standards in B2G collaboration than revealed in responses from the questionnaire. Overall, research participants from the business sector shared their experience resulting from their involvement in B2B collaborations where an exporting organization still exchanges data with the suppliers based on proprietary interfaces. Governmental actors on the other hand addressed the need of pre-defined data structures based on common semantics. In addition, models such as the WCO Data Model stimulate the leverage of IS standards. The results are as follows.

Benefits are expected in the form of standardized transactions. They allow higher accuracy in data processing, less manual activities to enter data and check their consistency and completeness. Process steps that involve certificates benefit from less hours spent in aligning paper based documents. Information that is relevant for certificate handling as in the case of the Green Lane concept hook into procedural information required in the IS transactions. Electronically processed export declarations

are processed faster as being shared before actual goods arrival and lead to higher accuracy in goods verification including declared value, tariff codes, and weights among other characteristics. Thus, higher accuracy is achieved within an organization and among the participating organizations. Intra-organizational processing is improved due to integrated data transfer for statistical and further reporting tasks the organization needs to fulfill. The reduction of error-sensitive data entry is realized in the first stage of the MASP execution due to proprietary IS solutions that were implemented in the majority of the participating countries. Improved standardized connectivity according to the respondents is expected to accelerate inter-organizational operational effectiveness.

In this context, the respondents addressed the importance of standardized transactions: procedural improvements, simplified administrative procedures, and consensus among collaborating partners on how to process legal and informal rules and guidelines were named as three significant characteristics of standardized transactions. Collaboration partners in the team experienced procedural transactions before-after: in one of the subprojects, control procedures have been standardized and simplified and in a second one, a standardized data model was introduced to the actors. As illustrated in the example of export process activities in network a) (see **Figure 3.12**), to-date operational activities are sequentially conducted. Customs officers wait for products and accompanying export documentation before executing the audit of the exporting organization. The manufacturer in this case needs to either transfer the products to the customs location for checking or prove his conformity with legal procedures. Following the idea of standard-enabled B2G, organizations are able to access data prior to the arrival of the shipment and tasks are carried out in parallel. To prove regulation compliance, legal authorities as in the Dutch case ask business actors to prove conformity with regulations.

One of the actors that participated in the case study, the EU Customs2 (see **Table 3.5**), raised the need to release unambiguous legal texts and therefore avoid misinterpretations of legal sources. The participant pointed to the POWER project that researched avoidance and standardization. Regarding the structural aspect of legislation, POWER is concerned with the question of how to derive codified and reusable elements from formalized legislation (cf. van Engers et al. (1998), p. 329). The perceived benefit of unambiguous legal sources and their reuse results from the dynamics of legislation. The reasons are rapidly changing environments and business demands. Those raise growing expectations in legislation to cope with those dynamics by issuing consistent and quality asserted legislation quickly and efficiently. Once successfully deployed, unambiguous legislation includes the provision of a commonly understood and

semantics based object-relationship model that provides common, formalized elements for new legislation and legislation changes. So far, the MASP includes supplementing material such as feature lists and application descriptions. Respondents welcomed the provision of references to the WCO Data Model. Furthermore, they acknowledge the inclusion of detailed risk and audit procedures within the regulation framework of MASP. Pro-actively shared experience takes place because of a tighter cooperation between governmental authorities on national level and among EU member states. Business actors on the other hand asked for templates and process patterns that should be added to supplementing material in order to achieve a higher adoption rate of regulations.

With respect to AEO certification, governmental actors prospect the following benefits of standardized data exchange. Firstly, standardized data is shared across organizations in an unambiguous way. Actors that participate in the certification and the deployment phases of the AEO program do not struggle with multiple data entry, data interpretations and verifying financial and organizational data of exporting business actors in multiple sources. Secondly, administrative efficiency is enabled because of positive data maintenance effects as described above and standardized, seamlessly processed reporting. Reporting is understood in any participating customs and tax authorities based on data structures agreed upon. Among other aspects, the two introduced are conceptualized and marketed by EU regulatory bodies to business and governmental actors. At the point of the study, AEO has been tested in a pilot project among EU member states and selected organizations. Further observations in the case study concerned the feedback of governmental authorities in two participating EU member states in relation to their opinion on AEO. Respondents miss procedural details that support customs authorities in the decision making process and voting structures to determine which EU member state is responsible to approve or reject the applicant. Among further procedural details, EU authorities did not determine yet if customs authorities have the right to accept or deny an application for the AEO certificate if the applying organization is not based in their countries. Another detail is related to data exchange and how data transfer and accessibility for non-EU customs authorities are managed. Issues are twofold. From an operational perspective, data access beyond completed certification requires a concept that regulates access profiles and access rights for each of the participating authorities. From a standardization perspective, data structures for AEO are not compliant with data structures currently used in other applications in the customs department. Technically, a single-sign-on functionality is missing in one observed member state and slows down the sign-on process for customs officers. Seamless data tracing from one application to another is not working for

example in the case that tax authorities ask customs authorities to process financial data of the applicant from the tax to the customs application. The AEO portal by the EU to-date cannot handle multiple addresses per applicant. Semantic distinction of first-tier, second-tier, and country-specific addresses are not conceptualized in the AEO concept.

This section concludes with a critical assessment of the B2G model proposed by the Modernized Customs Code. Respondents do not experience a concerted and choreographed approach by governmental authorities to unveil standardization benefits and homogeneous deployment of supporting IS applications. Though the MASP outlines deadlines for the deployment, an EU-wide development and implementation plan does not exist. In addition, standardization and public process concepts are not shared among EU member states. Thus, most of them tend to invest in proprietary solutions first or diminish the implementation scope to a tolerable and operational minimum.

6.5.6 Reflections on Institutional Influencers in B2G Collaboration Formation

Respondents referred to institutional elements of B2G collaboration. Some did due to the types of actors involved. Others referred to the subject of institutionalization in a sense that governmental authorities institutionalize regulations, behavior, and procedures. Respondents set into context governmental institutions and standards that become enforced through regulations. Following the feedback, standards differ from directives due to non-governmental authorities involved and non-regulatory binding capabilities of the issuing parties. Hence, distinct issuing parties cause diversity of standards. According to the respondents, the lack of a binding authority of the issuing party causes diversity of standards, too. Binding authority is apparent for example if private, non-governmental actors such as standard development organizations (SDOs) and inter-governmental organizations publish standards. In this case, non- and inter-governmental organizations do not have the formal authority or power to impose standards.

Furthermore, the respondents distinguished who is responsible for publishing standards and how standards become adopted. SDOs and organizations with high credibility publish standards. From their point of view, the adoption of standards however is not only fostered by SDOs, but by quality assurance measures such as certificates and successfully conducted conformity assessments. Another criterion they mentioned is the question of accessibility of standards. The lower access barriers are for users and organizations, the higher the potential that they adopt standards. The word of mouth was

rated as important as well as using the power of collaborating networks and dominant organizations that mandate standards to be used. Organizations that were explicitly mentioned to promote standards are multi-national companies (due to the high trade volume) and regulatory bodies. The latter stimulate adoption through legislation as in the case of the Modernized Customs Code (Table 5.5) or recommendations and governmental supplementing material in Sections 4.5.1 and 4.5.2.

6.5.7 Evaluation of the Observations

This section concludes with a reflection on the observations and interviews. Furthermore, it draws implications on the design of a B2G Procedure Model:

- According to the interviewees, the feasibility of the use of the standard-enabled procedure model depends on network size, the installed base, and collaborating actors that have been identified so far (see **Table 6.5**, **Table 6.6**, and **Table 6.8**). The focus that has been set by the interviewees requires a more detailed analysis of the real-world setting that is subject to standardization. Herein, the real-world setting emphasizes the preciseness of definition and description of the institutional constructs of the procedure model. The focus set by the interviewees so far reflects some but not all aspects of standardization. Furthermore, preciseness relates to clarity and unambiguity of regulations, inter-organizational process descriptions, and intra-operational activities that are steered by each of the stakeholders individually. Herein, preciseness follows the principles of semantic unambiguity. Only one interviewee referred to that topic by pointing to the XÖV-Framework of the German government (Salomon & Dietrich (2008)). The XÖV-Framework integrates process needs with functional and departmental needs (from a governmental perspective) and issues procedures and guidelines to trading partners of the German government. The XÖV-Framework labels IS standards as functional standards to distinguish them from purely technical standards that address technical collaboration needs. Besides, it adopts the procedural model from UN/CEFACT.

- The emphasis on securing intellectual property has been stressed by a few interviewees. The design of the procedure model so far does not include a governance process for securing intellectual property. An operational approach that is being implemented in organizations is patent filling. In literature too, filing patents was discussed as a formal way of securing intellectual property rights (cf. Shapiro & Varian (1999a), p. 16). Along the discussion of market positions and locked-in scenarios, technology providers use patent filings to control standards and keep

access rights to standards governed. While standards are available to the public, the disclosing policy (cf. Turowski (2000), p. 148-149) becomes an instrument that standard providers apply to decide upon safeguarding a standard and subsequently those applications that ground on the standard. Thus regardless the openness of a standard, locked features or consecutives IS applications that are relevant to apply the standard might be secured by the offering organization. If needed, users need to acquire access rights and pay. Thus through patents, software providers institutionalize control and influence upon vertical and horizontal compatibility. Component providers and users experience limited access to technical specifications. In other cases, developers do not seek control over rights and do not regulate visibility of standards. In theory, network participants in return still gain easier standard access (cf. Zhu et al. (2006), p. 521). The issue of accessing secured property leads to the discussion of the open standards and if they are truly perceived as public good.

- The governance process according to respondents should include quality measures of standards. One model of quality measures is proposed by Tassey from the National Institute of Standards and Technology (NIST) (cf. Tassey (2000), p. 19). Tassey refers to four categories to classify the role of standard: quality and reliability, information standards, compatibility and interoperability, and variety reduction. The categories contain measures that focus on economic impact of standards in B2B environments. A second example is proposed by Fischer and Stelzer (cf. Fischer & Stelzer (2007), p. 17) and focuses on economic and IT-technical aspects of B2B. Hereby, Fischer and Stelzer extend Tassey's model with further categories: maturity, adoption ratio, specification detail, industrial relevance, openness, maintenance, and development lifecycle (ibid.). Concerning the involvement of distinct actors in the standard development process, the responses of the interviewees concerned different and somewhat misleading assumptions of the standard development process. One aspect referred to the under-representation and even missing participation of SMEs in standardization bodies such as standard development organizations (SDOs). Though respondents perceived large companies to dominate the standard development process, a study of SME participation in SDOs revealed not only the existence of SMEs in the process but also the dominance of SMEs in standardization in some cases (cf. de Vries, Blind, Mangelsdorf, Verheul & van der Zwan (2009), p. 14-15). The study shows that a general assumption of under-representation is not possible. The conclusions of the study that are seen relevant for the present discourse are as follows. The participation of SMEs is steered by influencing factors such as sector in which a SDO operates, economic conditions in a country and country-specific factors

such as overall enterprise structures, as well as the geographical reach of a standardization organization based on local, national, and international. Another interesting aspect in that study concerns the representation of interests of SMEs and if these are represented by SMEs themselves or by associations such as trade associations.

- Concerning the differentiation and commonalities of regulations and standards, Brunsson and Jacobsson define characteristics to describe regulations and standards (cf. Brunsson & Jacobsson (2002), p. 26-27). Characteristics include the issuing party of the standard, the impact of authority on the issue of standards and regulations, the origin of standards and regulations, and the range of formally enforcing standards and regulations. Further characteristics such as membership types and distinctive features were not found useful for the discourse in this dissertation. The approach of Brunsson and Jacobbson is generic and addresses standards as such. It does not focus on IS standards only. However, it gives an idea about the key differentiators of standards and regulations and about the process of transforming standards into regulations. Standards have the potential to diffuse formally if they transform into regulations as supplementing clause (ibid.). Herein, a key prerequisite of successful transformation is the institutionalization of a standard. Thus, the standard details and the specification of the standard are incorporated into the regulatory text. Once institutionalized, the deployment and subsequently the adoption of the standard follow the pattern of normatively triggered behavior. Organizations and their users are then formally asked to deploy the standard. Transformation depends on the scale and intensity of promoting, monitoring, and mandating the activities that organizations apply. With regard to individuals, Scott points to the impact of institutionalization on users as they become empowered by institutionalized activities (cf. Scott (2008), p. 220). Transformation might also be partly conducted by key standardization requirements that are supplements to a regulation but deployment is independently conducted by the standard development organizations. Successful transformation (institutionalization) requires carriers that transmit inter-organizational structures and ask for a certain ‘degree of acceptance’ among actors. Structures, rules, and procedures institutionalize if they are accepted in a normative, regulative way. Fully or partly legally binding structures depend on the regulatory authorities. Reflecting on the indications of standardization requirements in legal texts (see **Table 3.14**) regulatory carriers that ease standards use in B2G environments exist. This raises the assumption that it is sufficient that standards will be fully adopted if they are transformed into a legal requirement. Further investigation will be necessary to test this assumption.

- Given useful thoughts of the interviewees on the embeddedness of standards in an institutional thus regulatory environment, the proposed definitions of a standard are rather confusing.

Given the above-outlined observations and critical reflection, the further design of a B2G Procedure Model implies the following:

- The design elements of the procedure model emphasize the use of IS standards in a sense that they are clear, concise, and repeatable sequences of specifications and that they are offered free-of-charge to the audience. The use of standards as proposed in the procedure model is voluntary however explicitly perceived as beneficial and therefore standards themselves become recognized as a public good.

- The organizational constructs in the procedure model emphasize the stakeholders as identified in the real-world setting: business, governmental, and academic partners, as well as standardization bodies, trade and industrial associations. Addressees of the model to-date are rather multi-national companies than small and medium-sized enterprises. Limitations to certain industries were not experienced.

- Concerning the potential of standardization of semantics of processes and data, SDOs and inter-governmental institutions such as UN/CEFACT and the WCO invest in glossary definitions and semantically unambiguous defined terms. Still, terminology lacks coherent use across regulatory sources. It differs based on viewpoints taken that (a) terminology derives from national viewpoints and interpretations, and (b) business viewpoints differ from governmental viewpoints. Moreover, the usability of pre-formatted processes encounters a lack of IT relevant details as for example an overarching data model that provides pre-modeled linkage content in a consistent manner. In addition, there is an emerging need of including procedural and IT relevant details in regulatory texts. Concluding the modeling and the assessment of AFII, this work exposes B2G relevant elements such as linkages, linkage types and content, institutional forces, medium, and organizational constructs. The analysis of collaborating pairs in B2G (Figure 6.29) coincides with collaborating pairs of B2G and G2B from the simplified model (see **Figure 6.1**).

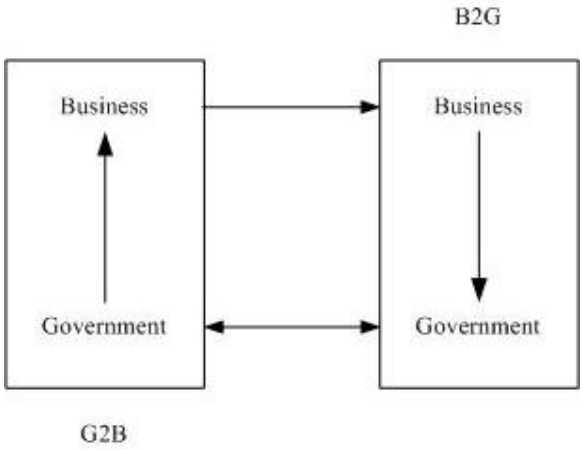


Figure 6.29: Directions of B2G collaboration

7 2nd Round of Design of the B2G Procedure Model

7.1 Introduction into Standard-Enabled B2G Collaboration

In alignment with the previous chapter, this chapter continues with the design and refinement of a procedure model to institutionalize B2G collaborations. Furthermore, it serves to respond to the possibility to institutionalize standard-enabled B2G collaboration. The multi-dimensional characteristics of B2G collaborations revealed a number of building blocks for B2G collaboration. Among them, standards find an entry as institutional medium. Further characteristics of B2G collaboration are as follows. Regulatory and procedural aspects concern any participants. Actors appear in same- and cross-level interactions and group in actor roles. Access to markets is not limited to actor types. Actor types that control access to markets and collaborations are not apparent in B2G collaborations. Access requires regulatory conditions that facilitate actors. Standards and their contribution to B2G collaborations come into view in expectations framed by observed actors and as indicated in regulations such as the Modernized Customs. Their potential role as institutional component is part of the proposed procedure model. In continuation of the previously elaborated conditions for B2G (see **Table 6.1**), conditions of standard-enabled B2G are (Table 7.1).

Table 7.1: Conditions for standard-enabled B2G

(h) IS standards need to be clear, concise, and be available for repeated use.
(i) Standards are a public good[5] and therefore to be offered free-of-charge, ideally pre-formatted and defined in an unambiguous way.
(j) Actors in B2G include business, governmental, and non-governmental actors. Furthermore, B2G requires the consideration of trade and industrial associations as well as standardization bodies where necessary.
(k) The use of standard-enabled B2G stimulates network effects through a larger installed base.
(l) Definition and description of the institutional constructs need to be precise.

7.2 Design Principles for the Standard-Enabled B2G Procedure Model

Considering the conditions of standard-enabled B2G collaboration and the analysis of organizational and institutional elements, the design principles for the procedure model derive from the analysis of B2G elements and the reference framework:

- The scope of B2G relevant activities is set through the definition of the organizational field. Actors (henceforth organizational constructs) that identify collaboration opportunities in trade should determine the organizational field(s) in which they would like to or need to participate. For modeling purposes, the organizational field forms through pre-defined number and characteristics of organizational constructs.

- B2G collaboration consists of collaborating pairs formed out of business, governmental, and inter-governmental organizational constructs. Organizational constructs operate on distinct levels such as organizations and organizational populations. Hereby, B2G distinguishes three types of organizational constructs: business, governmental, and inter-governmental constructs.

- B2G interactions base on 21 linkages types that describe interactions between business and governmental constructs. Content describes the purpose of interaction. Seven content types apply to B2G. They transmit through so-called medium types (see **Table 6.15**) applying distinct format types (see **Table 6.16**).

[5] Public good in this sense refers to the definition of open, thus publicly made available standards as defined by Krechmer (2006).

- B2G initiates through institutional forces that are compliance and governance based. Any linkage type and content is part of an institutional context: national and supranational regulations as well as inter-governmental conventions and recommendations. Dependencies between governmental and inter-governmental constructs influence B2G activities to national transposition differences. The transposition distinguishes 100% transposed and partly transposed. 100% transposition relates to conventions and recommendations that turn into a legally binding institutional act without alterations. Any convention that has a transposition below 100% is softened. The so-called softening factor results in a non-legally binding, supplementing recommendation. Actors in B2G should be aware of the softening factor that will result in different application procedures for an institutional force on the receiving end of collaboration.

- A review of institutional, thus legal change is necessary to keep institutional forces up-to-date and actors informed. The update of regulatory forces requires an assessment of institutional forces. Envisioned as subscription of regulatory updates or formally conducted pre-announcements, a provision of updated and modified regulatory forces will influence the usability of the model.

- Terms and terminology follow the principle of uniquely defined and unambiguous definitions. Terms and terminology are shared among actors and accessible to those actors that do not participate yet in the organizational field.

- The preferred medium type where applicable is electronic. The format of electronic medium is standardized and specified where applicable.

- The underlying case for the procedure model focuses on trade and customs specific activities. However, it aims for an overarching approach that is applicable to other organizational fields.

For the collection and analysis of essential detail for the procedure model, reiterations of documented and additional material and reassessing impact on the procedure model were necessary. Reiterations served to identify procedural steps and to abstract from the underlying case to a generic model. The logic of analysis revealed connectors that chain elements in a certain direction and order. Outputs of the elements frame the model. The procedure model grounds on the desired output and then concludes in the meta model (Figure 7.1). The meta model in Figure 7.1 sets into relationship ‘organizational construct’, ‘linkage type’, ‘linkage’, ‘institutional force’, ‘linkage content’, and ‘medium type’. Each relationship is explained by a verb. Linkage types are based on the

previous conducted assessment (see **Table 6.13**). Furthermore, six elements that define linkage content, three elements that define medium types, and three elements that define format types were identified. The elements are essential to the model and therefore added. The relevance is based on the following: format and medium types that are being used describe the degree of standardized content and linkages. Therefore, they determine the degree of standard-enabled collaboration. The medium type 'ICT-enabled' and a 'standardized, specified format' determine the highest degree of standard-enabled B2G interaction. 'Paper-based', 'descriptive' interactions reveal an inferior usage of standard-enabled B2G interaction.

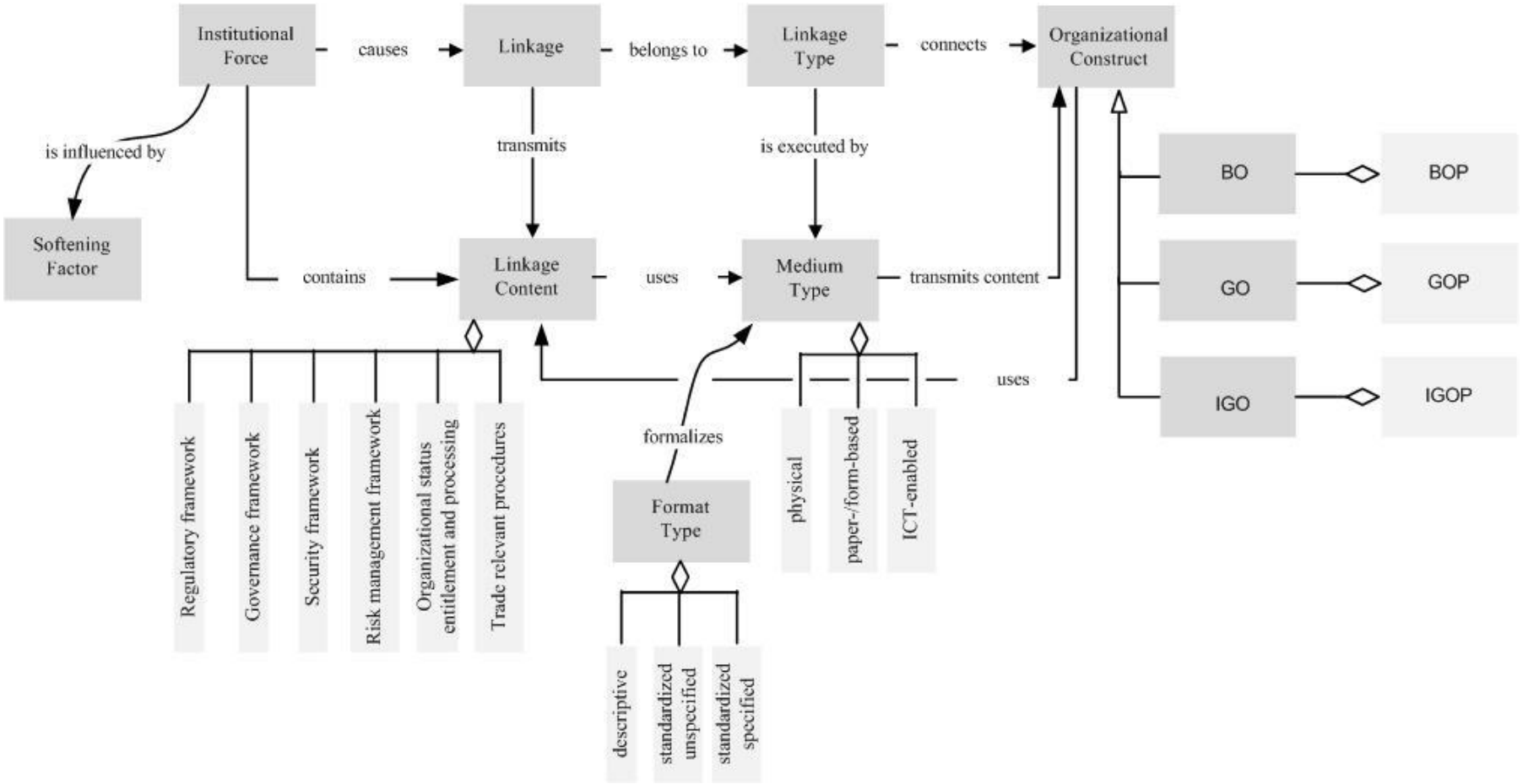


Figure 7.1: Meta model of B2G outputs

Now, the B2G Procedure Model sets into context the above outlined design principles. It partly derives from established approaches in network formation (cf. Brass (1995), p. 16-17) and the Analytical Framework II (Scott (2001), p. 71-73) serving as guiding principles. Enhanced with experience gathered during the analysis and design of B2G relevant elements within the reference framework, a broad investigation of B2G and trade relevant activities and constructed through the analysis of regulatory and complementing sources refined the approach and revealed further details. Figure 7.2 illustrates the overall procedure model. The model composes above-outlined elements and constitutes the construction phase of an iterative approach in B2G collaboration formation. The procedure model serves as universally understood concept. The interrelatedness of the elements indicates the dependencies of each of the elements and describes the direction the interrelatedness takes.

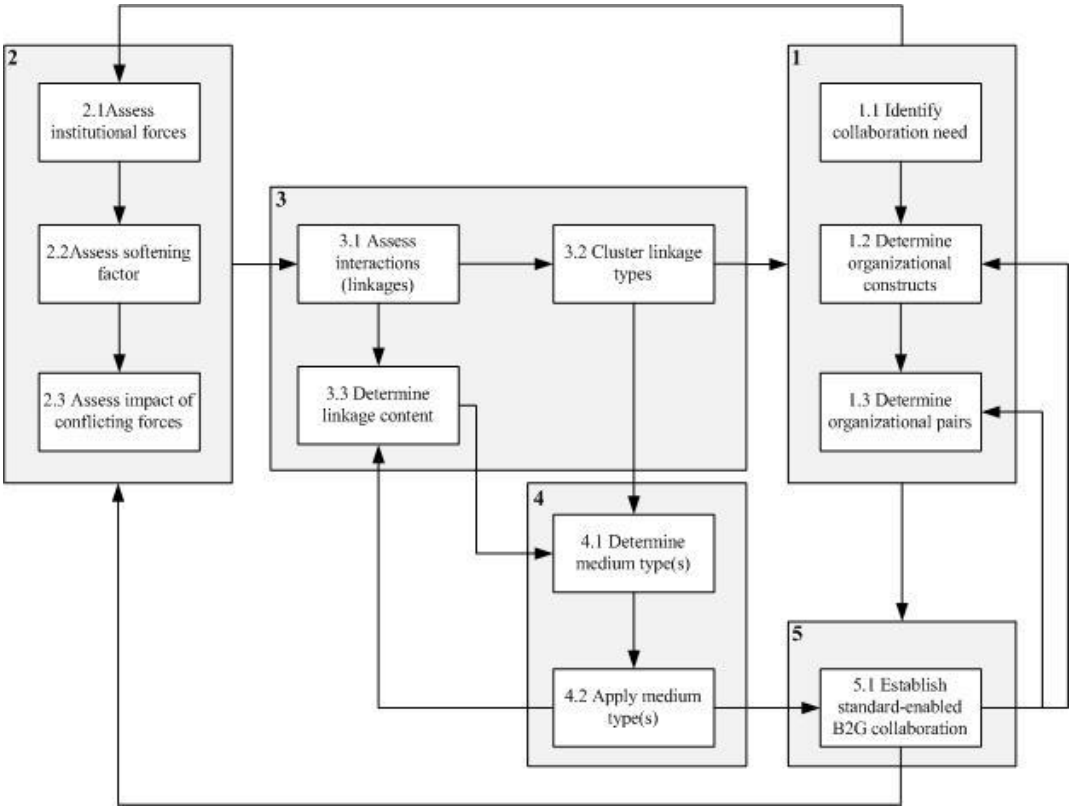


Figure 7.2: Procedure Model of B2G collaboration - overview

The procedure model is described in this chapter. Sections 7.3 to 7.7 describe the different Parts 1 to 5 for the procedure model. The parts are as follows (Table 7.2).

Table 7.2: Procedure Model of B2G collaboration – Parts 1 to 5

Numbered parts of the B2G Procedure Model	Scope of the Parts
Part 1	Identification and determination of organizational constructs
Part 2	Identification and determination of institutional forces
Part 3	Identification and description of public processes
Part 4	Determination of medium types and determination of the applicability of standards
Part 5	Establishment of standard-enabled B2G collaboration

To ensure a uniform description of task details, output, roles, resources, description, and activities for each of the tasks, each part and corresponding tasks (1.1 to 5.1) use the following template for (Table 7.3). The template derives from an assessment of intra- and inter-organizational process engineering (Winter (2003)) and is adapted to the specific requirements of this work. Each of the activities within the Tasks 1.1 to 5.1 are described accordingly and sequentially numbered based on the task they belong to.

Table 7.3: Template for the description of procedural phases

Task: Specifies phase and sub phase with a meaningful name		
Output: Lists most significant outputs	Roles: Describes roles necessary to conduct tasks	Resources: Lists resources that are made available in other research studies and cases and that are accessible to actors and users of the procedure model to facilitate or foster the completion of a task or activity
Description: Contains textual description		
Activities: Outlines necessary activities to complete the task		
Dependent tasks: lists tasks that interrelate with present task		

7.3 Identification and Determination of Collaborating Actors

The first part of the procedure model concentrates on those actors that seek to collaborate (Table 7.4).

Table 7.4: Description of task ‘Initiate B2G collaboration’

Task: 1.1 Initiate B2G collaboration		
Output: Kick-off of B2G collaboration	Roles: Business actors of trader community that initiate collaboration: manufacturers and customers	Resources: Business development Supply relevant processes Sales orders
Description: The task triggers the formation and establishment of B2G collaboration and represents the formal kick-off.		
Activities: Initiate collaboration motivated by: To conduct business development To supply relevant processes (refilling storages and distribution centers) To fulfill sales orders		
Dependent tasks: 1.2		

Given the nature of trade, actors seek market and international trade opportunities with pre-known counterparts and / or pre-known trade regions. The kick-off of B2G collaboration leads over to the next task. Lookup services, industry associations, and yellow pages facilitate the process of identifying actor pairs, if not known beforehand. The activities of determining organizational constructs are described in detail in Table 7.5.

Table 7.5: Description of task 'Determine organizational constructs'

<table>
<tr><td colspan="3">Task: 1.2 Determine organizational constructs in organizational field</td></tr>
<tr><td>Output:
Collaboration chart that lists organizations and organizational populations involved and position in the collaboration schema
List of unassigned organizational constructs
Determine role of organizational constructs
Complete documentation
Updated organizational constructs</td><td>Roles:
Business and governmental engineers that engage in trade and customs relevant activities</td><td>Resources:
Identification of organizational constructs
Apply pre-existing knowledge from Figures 6.21 and 6.22
Network actor analysis techniques adopted from Brass (1995)</td></tr>
<tr><td colspan="3">Description:
The task seeks to identify organizational constructs and the position of each of the constructs in the overall collaboration chart. The identification is a pre-requisite for any further activity.</td></tr>
<tr><td colspan="3">Activities:
Determine domain the actors belong to: business, governmental, and inter-governmental
Determine the organizational construct the actors fit to: BOs, BOPs, GOs, or GOPs
Update collaboration chart from Figure 44 and identify B2G relevant collaboration activities (Figure 6.13, Table 6.1)
Assign actors to identified organizational constructs
Determine missing organizational constructs, aggregation levels, or conditions that prevent from deciding upon position of organizational construct
Decide upon relevance as well as inclusion or exclusion of missing organizational constructs</td></tr>
<tr><td colspan="3">Dependent tasks: 1.3</td></tr>
</table>

This part concentrates on aligning an organization's role and position in trade with the pre-existing knowledge outlined in the reference framework in Chapter 3. Given the pre-existing format of the organizational field of export, the identification of the corresponding construct is easy. Unless new organizational constructs appear in a trade chain, the pre-existing format is a reference document for any actor participating in trade. The identification of the position within the organizational field steers scope of any subsequent task. Based on the principles of the organizational field an organization can be more than one organizational construct: manufacturer acts as declarant as well as consignor. It is important then to identify all three organizational constructs (BO1, BO2, BO3), verify their entries in the collaboration chart, and add them if missing. With respect to governmental actors, the procedure model is usable for any regulatory authority (GO10). The following example illustrates the identification of the collaborating constructs. In case of Swiss-U.S. American collaboration, governmental constructs are part of non-EU member states relevant constructs: GO11_Swiss regulatory authority, GO11_U.S. American regulatory authority, GO2_Swiss customs

administration, and GO2_U.S. American customs administration. If required, the procedure model considers comparable constructs such as the European Union through a pre-formatted set of supranational relevant constructs GO1, GO10, and GOP7.

Based on previous identified scope of collaboration, the collaboration chart serves as overarching schema that supports the identification of organizational position and those pairs that interact (Table 7.6). Despite the number of constructs and the international and per-nature unlimited dimension of B2G collaboration, the identification of collaborating organizational constructs serves the need to scale down this complexity into individual organizational pairs. The documentation format applied in the reference framework eases the documentary part for further analysis.

Table 7.6: Description of task 'Determine organizational pairs'

<table>
<tr><td colspan="3">Task: 1.3 Determine organizational pairs</td></tr>
<tr><td>Output:
Position of organizational constructs in the collaboration schema
Definition of collaborating pairs
Add to documentation
Updated organizational pairs</td><td>Roles:
Business and governmental engineers that engage in trade and customs relevant activities</td><td>Resources:
Identification of position of actors in collaboration chart
Apply pre-existing knowledge from Figure 6.12 and 6.13, as well as Table 6.1
Network actor analysis techniques adopted from Brass (1995)</td></tr>
<tr><td colspan="3">Description:
This task embraces the identification and verification of collaborating pairs for each of the organizational constructs involved and from the position of these actors that seek support in B2G collaboration formation.</td></tr>
<tr><td colspan="3">Activities:
Identify pairs of organizational constructs that collaborate
Compare pairs with pre-existing list and extend if needed
Determine direction of actors that are involved: 'from' (sender) or 'to' (receiver)</td></tr>
<tr><td colspan="3">Dependent tasks: 2.1, 2.2, and 2.3, 5.1</td></tr>
</table>

The first of the activities in Task 1.3 applies pre-formatted organizational pairs. Deriving from pre-selected sources, proposed pairs reflect a substantial portion of any possible existing pairs. However, the list is not complete. A formal check of collaborating partners and their role in the collaboration is required to make sure that no organizational pair is missing.

The first part concludes with Task 1.3 and leads over to Part 2.

7.4 Identification and Determination of Institutional Forces

Similar to the first part of the procedure model, the second one relies on pre-existing knowledge as well as availability and accessibility of institutional forces. The assessment of activities requires similar analytical skills and techniques as the first one. In addition, this part requires a uniform approach to assess regulatory and supplementing material in a trade-determined context with non-governmental actors involved (Table 7.7). Legislation engineers formerly conduct regulatory assessments without including business engineers or network formation engineers. As outlined in Table 7.7, the assessment of institutional forces in this model requires the involvement of business engineers.

Table 7.7: Description of task 'Assess institutional forces'

<table>
<tr><td colspan="3">Task: 2.1 Assess institutional forces</td></tr>
<tr><td>Output:
List of directly involved, passed legislation with relevance to present B2G collaboration scenario
List of relevant inter-governmental sources
Updated institutional forces in form of subscriptions or pre-announcements</td><td>Roles:
Business and governmental experts or advisors
Trade and customs advisors ideally from local, national customs administration and trade associations (i.e. IRU (IRU (2009)), EVO (European Shippers (2005)))</td><td>Resources:
Pre-existing list of regulatory and supplementing sources
Identification of additional sources seeking advice from regulatory advisors</td></tr>
<tr><td colspan="3">Description:
This task triggers collaboration from a theoretical perspective, existing regulation and conventions. Unless actors initiate B2G collaboration through their sets of tasks (1.1 and 1.2), institutional forces remain un-applied. This task focuses on comparison of pre-existing regulatory sources for trade and requires multiple perspectives: national, supranational, and inter-governmental sources.</td></tr>
<tr><td colspan="3">Activities:
Compare national legislation requirements with pre-existing list
Include relevant national regulatory sources and regulatory changes
Decide upon relevance of supranational forces as in case that one of the organizational constructs reside within European Union
Compare supranational legislation requirements with pre-existing list
Include relevant supranational regulatory sources and regulatory changes
Assess inter-governmental sources and their relevance for the present collaboration scenario
Include relevant inter-governmental sources and updates
Prioritize institutional sources based on the order of national, supranational, and inter-governmental sources
Gather documentation of institutional forces and create list</td></tr>
<tr><td colspan="3">Dependent tasks: 2.2</td></tr>
</table>

Based on the identified regulatory sources from above, the following two tasks review and reassess potential exceptions and the inclusion of further sources. Task 2.2 in addition requires actors to familiarize them with conventions and issues of inter-governmental organizations. Because of the formation of inter-governmental constructs through governmental actors, the level of influence of conventions and recommendations on national legislation is high.

Table 7.8: Description of task 'Assess softening factor'

<table>
<tr><td colspan="3">Task: 2.2 Assess softening factor</td></tr>
<tr><td>Output:
List with 100% transposed and partly transposed conventions and supranational legislation
Documentation of procedural activities that result from partly transposed conventions and regulations
Identification of conflicting intergovernmental and supranational forces</td><td>Roles:
Business and governmental experts or advisors
Trade and customs advisors</td><td>Resources:
Pre-existing list of regulatory and supplementing sources
Identification of transposition levels and seeking advice from regulatory advisors
Conduct interviews if necessary
Review supplementing material</td></tr>
<tr><td colspan="3">Description:
At this point of the procedural model, regulatory requirements that are subject to form B2G collaboration are influenced by partly transposed requirements. As previously assessed, those influence rather business actors and extend procedural efforts they have to conduct to be compliant with regulatory requirements of the receiving end.</td></tr>
<tr><td colspan="3">Activities:
Determine transposition degree of supranational legislation and inter-governmental conventions from the perspective of the individual organizational construct
Document procedural and regulatory differences in partly transposed conventions and supranational legislation from an organizational construct and collaboration perspective and assess procedural, legal, and economic effects for collaborating pairs</td></tr>
<tr><td colspan="3">Dependent tasks: 2.3</td></tr>
</table>

The output of Task 2.2 reveals important information and discloses conflicting regulations on supranational and inter-governmental levels. Similar to task 2.2 the succeeding Task 2.3 eases the identification of regulatory conflicts (Table 7.9). This task follows Tasks 2.1 and 2.2 in a given order.

Table 7.9: Description of task ‘Assess impact of conflicting institutional forces’

<table>
<tr><td colspan="3">Task: 2.3 Assess impact of conflicting institutional forces</td></tr>
<tr><td>Output:
List with identified conflicting national legislation
Documentation of procedural activities that result from conflicting forces</td><td>Roles:
Business and governmental experts or advisors
Trade and customs advisors</td><td>Resources:
Pre-existing list of regulatory and supplementing sources
Conduct interviews if necessary
Review supplementing material
Get legal advice</td></tr>
<tr><td colspan="3">Description:
This task serves, similar to task 2.2, an assessment of regulatory conflicts that affect B2G collaboration. Conducting this task requires additional input and advice from trade and customs experts. The interpretation of regulatory differences needs legal expertise.</td></tr>
<tr><td colspan="3">Activities:
Compare national and foreign legislation based on procedural activities and organizational pairs that are in scope for B2G collaboration
Review planned regulatory changes and modifications
Document procedural differences and assess procedural, legal, and economic effects for collaborating pairs</td></tr>
<tr><td colspan="3">Dependent tasks: 3.1</td></tr>
</table>

The assessment of the secondary part of the procedure model requires tight cooperation and coordination among legal and trade experts. The results of Tasks 2.2 and 2.3 might require additional time. It is recommended to proceed with activities from 2.2 and 2.3 and parallelize them with the subsequent tasks if necessary.

7.5 Identification and Description of Public Processes

Despite the existence of various numbers of process repositories and B2B relevant process models, the domain of B2G relevant process analysis is rather small. They are apparent in (Elvesater et al. (2005); Greiner et al. (2007); Roser & Bauer (2007)). A study on public processes observes inter-governmental processes through the lens of publicly shared interactions and tasks (henceforth public processes) and points to their applicability in B2G collaboration (Wende, Vogel, Schemm, Schmidt, Osl, Höning et al. (2006)). Hereby, the third part of the procedure model introduces tasks that require the assessment of building blocks for public processes. The following tasks apply public process characteristics that result from the assessment of related work (see **Table 5.4**) (Figure 7.3).

Elements in the public process analysis	Description of the elements
Public-private viewpoint analysis	Publicly, visible and shared processes Intersections to private, intra-organizational parts
Determination of roles	Roles to identify and maintain public processes
Commonly shared tasks	Tasks that are needed to conduct the collaboration
Public process provision	Accessibility and management of public processes

Figure 7.3: Analytical elements of public processes

The public process characteristics therein are adapted to B2G relevant characteristics and outlined as follows (Task 3.1, Table 7.10). An iterative approach in Tasks 3.2 and 3.3 concretize the analytical assessment of public processes.

Table 7.10: Description of task 'Assess interactions'

<table>
<tr><td colspan="3">Task: 3.1 Assess interactions (linkages)</td></tr>
<tr><td>Output:
List of relevant interactions in a pre-formatted format
Updated interactions</td><td>Roles:
Business and governmental engineers that have experience in inter-organizational process assessment</td><td>Resources:
Inter-organizational business process analysis
Public process analysis
Determine interactions relevant for B2G from pre-existing list of interactions
Textual, descriptive analysis</td></tr>
<tr><td colspan="3">Description:
This task focuses on the determination of relevant interactions between identified collaborating pairs. The task uses the documentary material from tasks 2.1 to 2.3 to assess updated and newly introduced regulations.</td></tr>
<tr><td colspan="3">Activities:
Compare interactions from pre-existing list with newly identified procedural activities from tasks 2.1 to 2.3
Assess newly identified interactions
Distinguish private and public process parts
Identify commonly shared tasks, aggregate, and eliminate duplicates
Describe remaining interactions following format of pre-existing list
Extend existing list of interactions and conclude documentation
Determine roles to identify and maintain public processes
Determine accessibility and management of interactions</td></tr>
<tr><td colspan="3">Dependent tasks: 3.2</td></tr>
</table>

Task 3.1 supplies collaboration modelers with a simple but useful format to assess public processes in the first round. The format is based on subject-verb-object relationship between business and governmental constructs. The analytical and documentary parts require a textual screening unless the results from Tasks 2.1 to 2.3 did not extend or change the pre-existing list of regulatory sources. Table 7.11 exemplifies the analysis.

Table 7.11: Exemplified subject-verb-object analysis

Subject (from)	Verb		Object (to)
	Linkage	Linkage content	
GO11: non-EU member state	Comply with	100% physical security measures	BOP7: carriers BOP8: logistics service providers

A formal notation of the public processes has not been used so far. It is suggested to depict a public process formally, graphically, and technically (Figure 7.4). A formal depiction eases the identification of the process details and fosters the agreement upon the details among the participating actors. Represented in a format that has been agreed and is understood among actors, a graphical representation of the public process fosters even better the reconciliation process. The formal depiction requires an agreement among actors upon notation and formalization upfront. UML or further graphical formats such as the UN/CEFACT Modeling Methodology based diagrams are applicable for the graphical depiction. Furthermore, the technical readability of public process is feasible with specification schemas. So far, the technical aspects of a public process are important but require further research that goes beyond the scope of this work.

Technical aspects of public processes		Details
	Formal depiction	Agreement upon notation and formalization means
	Graphical depiction	Graphical notation languages such as UML or methodologies such as UN/CEFACT UMM diagrams
	Technical readability	Enabled by process specification schemas

Figure 7.4: Technical aspects of public processes

Based on the verification of existing and reusable interactions as conducted throughout Task 3.1, Task 3.1 serves also to verify and double check newly introduced interactions.

In case no interactions are being required, modelers can skip Task 3.1 and proceed with Task 3.2. Then, Task 3.2 provides a pre-formatted table of linkage types. In case interactions are being added, Tasks 2.1 to 2.3 cover additional interactions.

Table 7.12: Description of task 'Cluster linkage types'

<table>
<tr><td colspan="3">Task: 3.2 Cluster linkage types</td></tr>
<tr><td>Output:
List of relevant interaction types in a pre-formatted format
Updated linkage types</td><td>Roles:
Business and governmental engineers that have experience in inter-organizational process assessment</td><td>Resources:
Inter-organizational business process analysis
Public process analysis
Apply pre-existing list of interaction types and cluster interactions if necessary
Textual, descriptive analysis</td></tr>
<tr><td colspan="3">Description:
This task focuses on the clustering of interaction types and eases the identification of the scope of collaboration. The task applies documentary material from task 3.1 unless institutional forces remain the same as those provided as pre-existing material.</td></tr>
<tr><td colspan="3">Activities:
Compare interaction types from pre-existing list with newly identified procedural interactions from task 3.1
Assess impact of linkage types on pre-existing interactions and verify usage with customs and trade advisors if needed
Extend existing list of interaction types and conclude documentation
Determine roles to identify and maintain public processes
Determine accessibility and management of interactions</td></tr>
<tr><td colspan="3">Dependent tasks: 3.3, 4.1, 1.3</td></tr>
</table>

Similar to Task 3.1, this task applies pre-existing linkages. The clustering of linkages is a pre-requisite for the determination of public processes in B2G. Twenty-one linkage types in B2G collaborations have been identified in the first round of design. Table 7.13 lists them. Once formally depicted as suggested in Table 7.11 and described following the elements of Figure 7.4, any of the given entries in 7.13 is being provided to the collaborating constructs for further usage.

Table 7.13: Pre-existing linkage types in B2G

Linkage types 1-7	Linkage types 8-14	Linkage types 15-21
1 Accredit	8 Ease	15 Mandate
2 Allow	9 Exchange	16 Prove
3 Check	10 Facilitate	17 Provide
4 Comply with	11 Get access to	18 Release
5 Conduct	12 Give access	19 Require
6 Cooperate in	13 Issue	20 Submit
7 Dispense with	14 Manage	21 Verify

The assessment of linkage types leads over to the assessment of content types and Table 7.14.

Table 7.14: Description of task 'Determine linkage content'

Task: 3.3 Determine linkage content		
Output: List of interaction content that transmits to organizational constructs via linkages Content documentation Updated linkage content	Roles: Business and governmental engineers that have experience in inter-organizational process assessment	Resources: Inter-organizational business process analysis Public process analysis Apply pre-existing list of content and extend if necessary Textual, descriptive analysis
Description: Unlike the format of public processes, the separation of linkage types and linkage content isolates the content part from the technical, connecting part. This task eases the identification of pre-existing content parts in regulatory sources and the identification of issuing governmental institutions.		
Activities: Assess content Determine roles to identify and maintain content Determine accessibility and standardization content		
Dependent tasks: 4.1		

Content that forms collaborating activities embraces the content as outlined below (Table 7.15). Six content types have been identified in the first round of design.

Table 7.15: List of pre-formatted content

Pre-formatted content
1 Regulatory framework
2 Governance framework
3 Security framework
4 Risk management framework
5 Organizational status entitlement and processing
6 Trade relevant procedures for export, import, and transit

Regulatory sources point to any of the content types. Despite the numerous use of content, the provision of formally notated documentation or bibliographic references in regulatory sources is missing. If included in regulatory sources, additional sources of information are provided as descriptive text.

7.6 Determination of Medium Types and Applicability of Standards

Concluding from Part 3, Part 4 of the B2G Procedure Model outlines necessary activities and techniques (Task 4.1, Table 7.16). It focuses on the applicability and the conditions for using IS standards in B2G. The design approach of the procedure model proposes the institutional concept of medium types that helps to distinguish physical, paper-based, and IT-enabled collaboration parts, and applicable formats that are either descriptive or standardized. The third part concluded with an assessment of relevant building blocks of B2G collaboration. Its results play an important role to assess standardization potential for each of the named content. Some of the above-assessed tasks point to the potential role of standards as a medium in B2G collaborations. The analysis of B2G elements supported the argument of including standards in the B2G Procedure Model. However, customs-specific B2G collaboration studies revealed a strong presence of paper-based customs management and less use of standards (The World Bank (2004)).

Table 7.16: Description of task 'Determine medium type(s)'

<table>
<tr><td colspan="3">Task: 4.1 Determine medium type(s)</td></tr>
<tr><td>Output:
Assessment of standardization potential of linkage types and content
Cluster of physical, paper-based, and IT-enabled
Updated description of medium types</td><td>Roles:
Process modeling engineers
Standardization engineers
Trade and customs engineers</td><td>Resources:
Textual, descriptive analysis
Alignment of IS standards framework characteristics</td></tr>
<tr><td colspan="3">Description:
This task is the central task for enabling standardized B2G collaboration. It assesses role and potential of IS standards in B2G. It focuses on the definition of medium types resulting from previously conducted tasks 3.1 to 3.3 and the provision of a standards framework that facilitates the identification of standardizable content.</td></tr>
<tr><td colspan="3">Activities:
Assess medium types that are named, proposed, and provided
Assess conditions for standardizing content and determine criteria that form standards framework
Evaluate existing standards that fulfill criteria
Define conditions of IS standards usage
Decide upon standards framework that fulfills criteria
Provide linkage content and linkage types in modeled, pre-described manner</td></tr>
<tr><td colspan="3">Dependent tasks: 4.2</td></tr>
</table>

Standard relevant activities firstly relate to decide upon which standard(s) to use. B2G collaboration faces a number of theoretical options:

- Option 1: business partners provide interfaces that support the adoption of standards on governmental sites (Figure 7.5)
- Option 2: actors apply a meta-standard that assimilates standards in a commonly used business standard framework (Figure 7.9). A meta-standard is hereby defined as a standard that by the provision of modeling guidelines and elements is applicable to all standards. The guidelines enable the standardization community to harmonize standards and reach a common sense. The elements refer not only to syntax, but also to semantics and pragmatics and allow users to apply them. Herein, the meta-standard is on top of all underlying standards.
- Option 3: introducing a hybrid model with pre-formatted standardization requirements in regulatory sources, but also individual design and use of business standards

To deploy the first option (Option 1), collaborating partners face investments in decentralized and local versions of standards as well as deployment efforts. It required standardization efforts to distinguish industry-specifics for commonly shared public processes. Recalling the research question, standards in that scenario do not ease collaboration between business and governmental actors, but hamper it. Examples of used, however not worldwide accepted vertical standards are agroXML (Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. (2005)), RosettaNet (RosettaNet (2009)), Odette (Odette International Ltd. (2009)), EDIFOR (Deutscher Speditions- und Logistikverband e.V. (DSLV) (2006)), and papiNet (papiNet, IDEAlliance, & AF&PA (2004)).

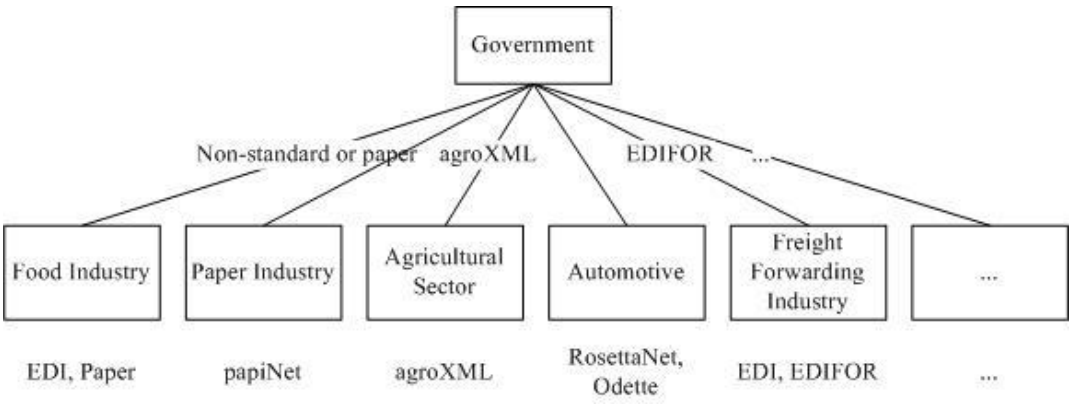


Figure 7.5: Standard-enabled B2G collaboration option 1

In contrast to the first option (Option 1), the second option (Option 2), a meta-standard embraces cross-organizational and non-industry-specific elements namely processes, data, messages, and forms. Option 3 is a hybrid or transition-based approach that requires the inclusion of standardized elements and guidelines in regulatory sources, but leaves it up to the adopters to execute the standardization requirements individually. Hereby, option 3 offers a new approach that proposes legal, standardization specific requirements in a global format.

With Option 2, ideally, the meta-standard becomes compatible to industry specific standards following design principles and guidelines. To-date, first attempts are in progress to investigate cross-sectoral usage of standards. The research field of IS standards frameworks concerns what is needed for the cross-sectoral use. Nurmilaakso et al. analyzed a number of IS standards (Nurmilaakso & Kotinurmi (2004); Nurmilaakso et al. (2006)). Table A.9.4 gives an overview of IS standards applied by Nurmilaakso et al. for their research (see **Table A.9.4**). They investigate non-technical and technical dimensions and raised questions about the purpose and openness of IS

standards. They saw a need to assess actors that drive the standardization and how standards are developed and made suitable to actors' requirements. Thus, it resulted in a non-technical dimension in which they encompass application scenarios in which the standard is being applied, the drivers of standardization, and the extent to which the business standard is open (Figure 7.6).

Non technical categories and sub /subcategories of business standards	
Industry	Application scenarios
Drivers	Drivers of standardization
Organization	Standard development process
	Organizational aspects of standardization
Openness	Extent to which business standard is open

Source: cf. Nurmilaakso & Kotinurmi (2004); Nurmilaakso et al. (2006)

Figure 7.6: Non-technical characteristics of IS standards

The assessment of technical characteristics resulted in a proposition of building blocks for standard-enabled businesses. (Nurmilaakso & Kotinurmi (2004); Nurmilaakso et al. (2006)). Building blocks are business processes, documents, and data (see Figure 7.7).

Elements in business standards framework	Description of the elements
Business processes	Analyze processes from a public-private viewpoint analysis, depict and describe an acceptable format
Business documents	Analyze semantics, structure, and syntax of documents based on data, forms, and processes Choose publication formats like data dictionaries, conceptual models, and naming design rules
Data exchange	Specify exchange based on applicable technical standards

Source: cf. Nurmilaakso & Kotinurmi (2004); Nurmilaakso et al. (2006)

Figure 7.7: Pre-requisites of IS standards usage

Further research attempts explore convergence theories and the assimilation of vertical standards to non-sectoral standards. Studies in this context are being undertaken by (Jain & Zhao (2003)) and (Mendoza & Ravichandran (2007)). The conceptual model of Jain and Zhao provides an interim solution to understanding the viewpoints from vertical standards and the issuing standardization organizations. They investigate in how to aim for assimilated standards. One approach they propose is to concentrate on

common semantics among industry-specific standards, describe them and issue XML schema that are then being offered across industries (Jain & Zhao (2003)).

Compared to UN/CEFACT, Jain and Zhao offer naming design rules that are the syntax the convergence should follow. The alignment of UN/CEFACT with the proposed elements of a IS standards framework reveals a fit of the elements of UN/CEFACT with the elements as proposed by Nurmilaakso et al. UN/CEFACT responds to the proposition of a semantic repository with the Core Component Library, the proposition of a process and data modeling methodology with the Unified Modeling Methodology (UMM), the proposition of specifying business data with the provision of a technical specification guide called Core Component Technical Specification (CCTS) in a syntax-adherent format through the provision of the so called Naming Design Rules, and the provision of infrastructure relevant elements with the UN/CEFACT Registry Specification. The mechanism to publish and communicate the standardization result is taken care of in the concept of UN/CEFACT and the concept model of Jain and Zhao. Unlike UN/CEFACT and the recommended IS standards framework of Nurmilaakso et al., the model of Jain and Zhao does not cover collaborative business process modeling. It does not offer a methodology that guides through the semantic modeling process. Overall, the proposition of assimilating vertical standards requires a substantial amount of operational activities. The alignment among vertical standards requires a pre-assessment of each of the vertical standards and an iterative approach to assimilate further vertical standards. Investments need to be made to align and compromise among standard development organizations, assimilate data dictionaries and agree upon further details. Figure 7.8 summarizes the assessment of the approach of Jain and Zhao and compares it with the core elements of the IS standards framework of Nurmilaakso et al. and the elements that are proposed by UN/CEFACT.

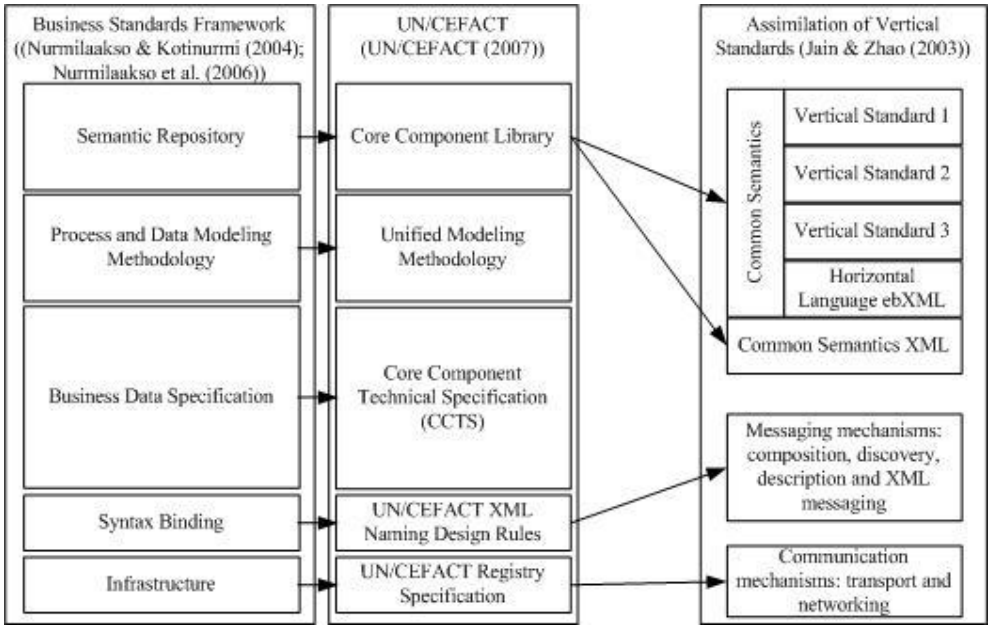


Figure 7.8: Alignment of vertical standards and IS standards

In case a standard as for example UN/CEFACT is being adopted as a meta-standard, standards converge or aggregate to that meta-standard. The second option (Option 2) assumes that all actors reached a consensus on the technical and non-technical elements of the meta-standard and defined the elements as proposed (Figure 7.9).

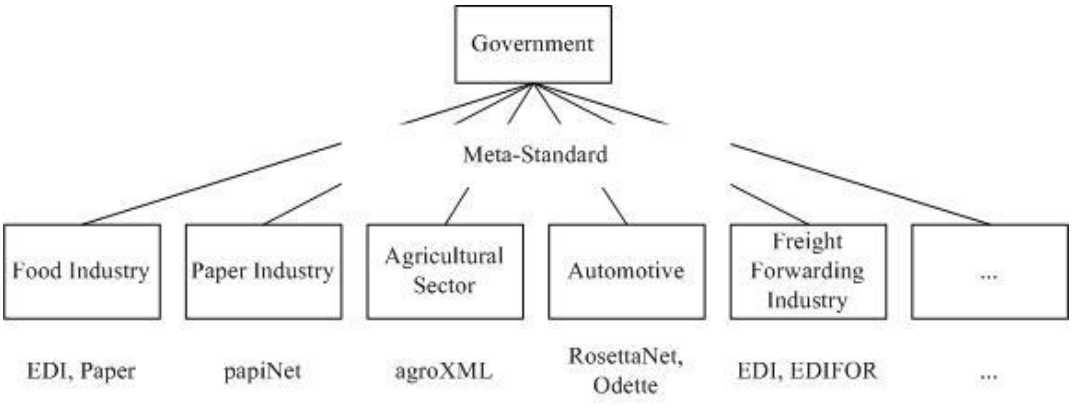


Figure 7.9: Standard-enabled B2G collaboration option 2

The applicability of both options is subject to the Task 4.2. Activities are summarized in Table 7.17. It is assumed that actors check if pre-existing elements are applicable in the collaboration scenario.

Table 7.17: Description of task 'Apply medium type(s)'

<table>
<tr><td colspan="3">Task: 4.2 Apply medium type(s)</td></tr>
<tr><td>Output:
Standardized content and business standard framework
Alignment, maintenance, and deployment concepts for standards provision in the organizational field
Report on deployability of medium types</td><td>Roles:
Process modeling engineers
Standardization engineers
Trade and customs engineers</td><td>Resources:
Standardization activities for distinct types
UN/CEFACT open development process
UN/CEFACT Modeling Methodology (UMM) for public process modeling
UN/CEFACT Core Component Technical Specifications (CCTS) for data and message standardization
Document engineering with focus on private process engineering
UML diagrams for the modeling
Provision of assimilation tools to assess vertical requirements in cross-sectoral collaboration with industry-specific aspects</td></tr>
<tr><td colspan="3">Description:
This task follows task 4.1 and focuses on the development and deployment of standards. It covers the provision of standards. This task promotes the usage of a worldwide applicable business standard that fulfills criteria as outlined in task 4.1. The criteria to follow are those of Figure 7.10.</td></tr>
<tr><td colspan="3">Activities:
Provision of standardized elements (processes, data, and forms)
Apply standardization to pre-existing elements (Figure 7.11)
Determine accessibility and maintenance of standards framework
Define integration potential and needs with legislation modeling
Define necessity of remaining paper-based and physical activities
Align standardization activities within the standard development process</td></tr>
<tr><td colspan="3">Dependent tasks: 5.1, 3.3</td></tr>
</table>

An overview of the pre-existing elements as applied in the previous tasks is now provided in Figure 7.10. Figure 7.10 points to pre-existing elements by cross-referencing to the relevant topics and indicating the corresponding tables and figures in the text boxes. The elements are now reusable for the modeling process of Task 4.2. Task 4.2 will reveal if standardization is applicable to any of these elements if not already legally required, published or in use by other organizations. In case pre-existing elements are not applied yet, organizations have the opportunity to consider their internalization and use within their organizations. Further details concerning internalization is now subject of Task 5.1 in the next section.

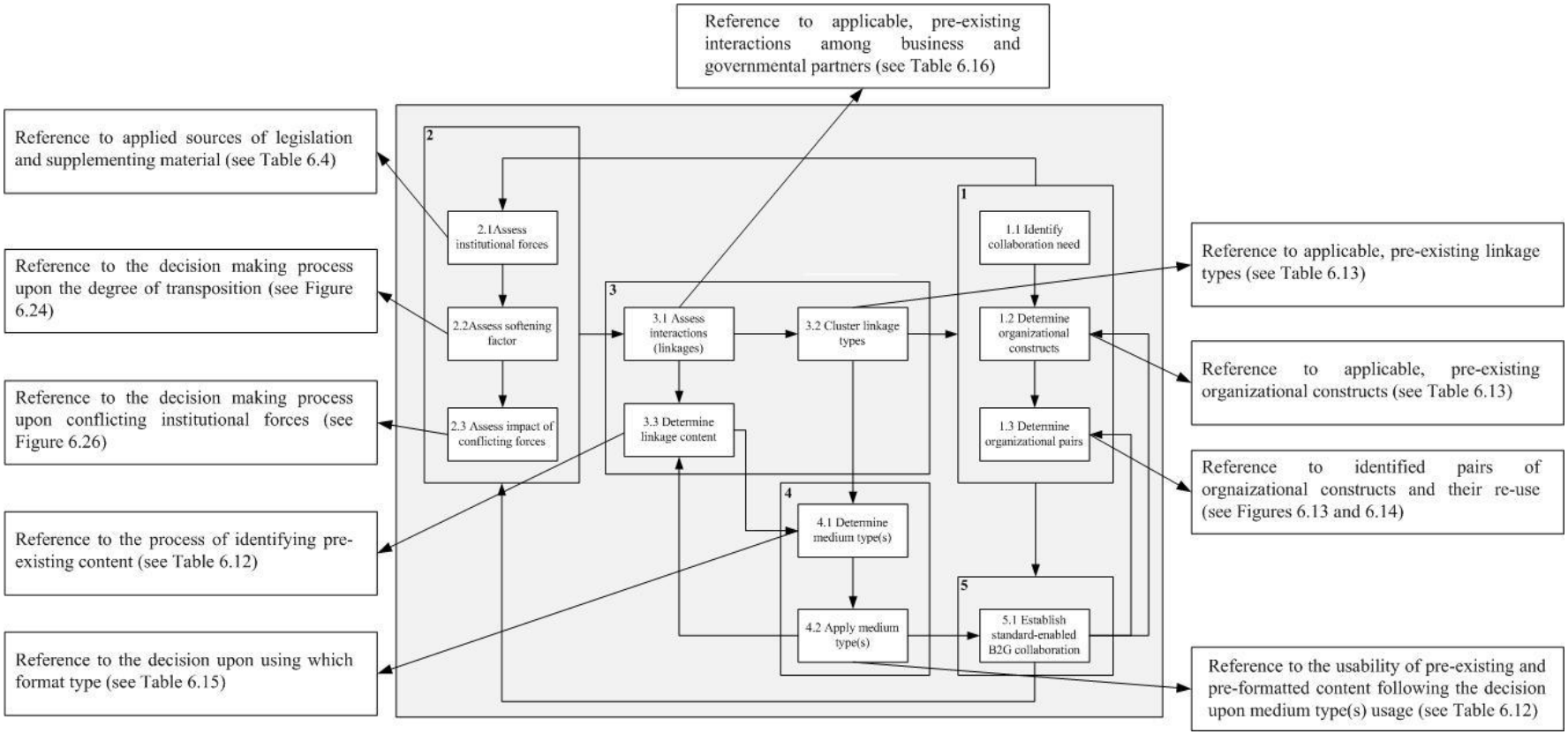


Figure 7.10: Alignment of pre-existing constructs to the procedure model

7.7 Establish Standard-Enabled B2G Collaboration

Previous tasks and parts of the procedure model conclude into the establishment of a standard-enabled B2G collaboration (Task 5.1, Table 7.18). This section points to necessary activities and denotes pre-requisites to succeed with the collaboration.

Table 7.18: Description of task 'Establish standard-enabled B2G collaboration'

<table>
<tr><td colspan="3">Task: 5.1 Establish standard-enabled B2G collaboration</td></tr>
<tr><td>Output:
Internalization of standardization method and content into B2G collaboration</td><td>Roles:
Process modeling engineers
Standardization engineers
Trade and customs engineers</td><td>Resources:
Open standard development process activities that refer to publication, deployment, and maintenance of IS standards
Document engineering with focus on private process engineering
UN/CEFACT Modeling Methodology (UMM) for public process modeling or other modeling techniques
UN/CEFACT Core Component Technical Specifications (CCTS) for data and message standardization or other data and message specification techniques</td></tr>
<tr><td colspan="3">Description:
This task focuses on the institutionalization of the collaboration. It needs to take into account that access to B2G collaboration is determined through regulatory compliance and therefore unlimited. Coordination needs arise from activities that embrace regulation updates, pre-formatting of legislation and public process models, as well as publishing these. Further actor roles need to be assessed to conduct maintenance and conformity needs. An alignment with conformity assessment activities as conducted by the US Chamber of Commerce for example is highly recommended.</td></tr>
<tr><td colspan="3">Activities:
Institutionalization of collaboration
Ensure unlimited access to collaboration
Determine coordination needs
Define additional actor roles required
Internalize standards and public processes
Execute collaboration</td></tr>
<tr><td colspan="3">Dependent tasks: 1.2, 1.3, 2.1, 2.2, 2.3</td></tr>
</table>

At this stage, the applicability of Parts 1 to 3 proved along the institution based analysis of organizational and institutional constructs in the reference framework. The sign-off of Parts 4 and 5 require the proof of concept that tests the applicability of a standard that fulfils the above outlined criteria and assesses internalization needs required for the

collaboration formation. One of the critical success factors that result from the above outlined activities (Table 7.18) concerns the incorporation of IS standards such as UN/CEFACT into intra- and inter-organizational operations. Intra-organizational operations evaluate impact and efforts to align to B2G. Efforts relate to the alignment of the standard to existing IT landscapes and process models. Regulatory authorities need to extend legislation modeling tasks by applying design principles that account for semantic unambiguous modeling results. A major pre-requisite for successfully established B2G collaboration by standards is to overcome obstacles that result from G2G-caused conflicting and competing institutional forces.

So far, standard development organizations agree in expert rounds on standard design and development activities. Regulators become involved to represent national interests and local businesses (Figure 7.11). The involvement of actor types is symbolized with an arrow (‘↑’).

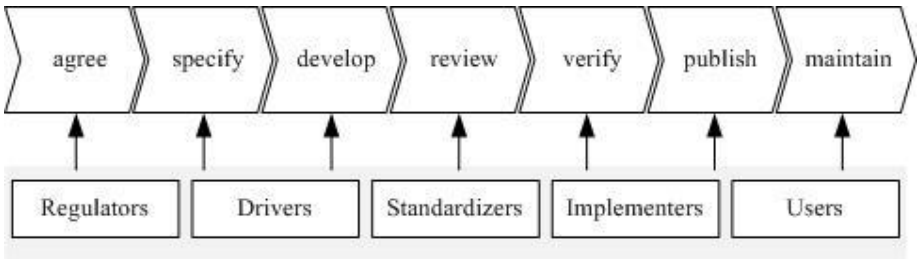


Figure 7.11: Standard development process to-date

In customs-relevant collaboration, regulatory requirements steer customs activities for any actor involved. This work assumes that regulations are able to trigger standard development directly and to provide regulatory content in a pre-formatted format (Figure 7.12). Thus, regulators are involved in the phase of agreeing and specifying. By this, standard design builds on regulatory requirements and aligns process and data requirements. In subsequent phases, drivers of standardization, standard developers, implementers, and users meet to specify, develop, review, verify, publish, and maintain a standard. The difference to the current process as outlined in Figure 7.11 lies in a regulation-based standard development process. The involvement of actor types is symbolized with an arrow (‘↑’). The recommended change therein refers back to the procedure model and the Tasks 3.3 and 4.2.

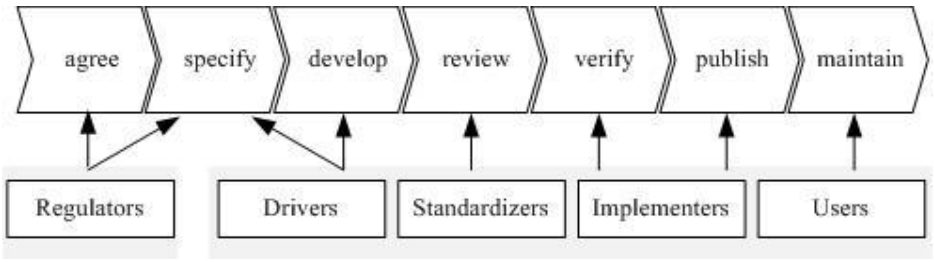


Figure 7.12: Regulation-based standard development

7.8 Graphical Depiction of the B2G Procedure Model

In addition to the textual task description and assigned activities, the following section provides a graphical depiction of the procedure model. The graphical modeling results in a flow chart diagram that sets tasks and relevant activities of the procedural model in context. The flow chart for the B2G Procedure Model (B2GPM) follows the previously-outlined Parts 1 to 5 and their core Tasks 1.1 to 5.1 as illustrated below (see Figure 7.13). The Tasks 1.1 to 5.1 are now briefly introduced:

- In Part 1, three tasks were identified. Task 1.1 concerns the initiation of the collaboration, Task 1.2 the determination of the organizational construct, and Task 1.3 the identification of organizational pairs.

- In Part 2, three tasks were identified. In Task 2.1, the user of the B2GPM identifies the relevant institutional forces. Task 2.2 refers to the identification of the softening factor if existing. Task 2.3 concerns the identification of potential conflicts from a legal perspective.

- In Part 3, Tasks 3.1, 3.2 and 3.3 focus on the analysis of interactions among collaborating actors. Therefore, Task 3.1 facilitates the identification of linkages that are being clustered in Task 3.2. Based on the identified linkages, Task 3.3 takes care of the identification of content that is subject to the collaboration. Both tasks, Task 3.2 and 3.3 point to the use of medium types such as paper, standards, or forms.

- Part 4 concerns the identification of applicable medium types based on the pre-selected content and linkages. Task 4.1 determines the medium type or types. The application of the medium type or types is carried out in Task 4.2. Application refers to the use of selected medium as for example a standard or a paper-based procedure. Their application is prerequisite to establish the collaboration in Task 5.1.

- The B2GPM concludes with Part 5 that triggers the establishment of the collaboration through Task 5.1. Once completed, Task 5.1 as outlined in the flow chart diagram (see **Figure A.9.6**) and the verbal description (see **Table 7.18**) loops back to the initiation of the collaboration and therefore points to Tasks 1.2 and 1.3.

Besides the described activities within a task, each of the tasks refers to output of the tasks, involved roles, applicable resources, and refers to subsequent tasks and activities. The uniform application of the content of tasks and activities for each of the parts facilitated the arrangement of activities in a proper sequence. The diagram outlines corresponding tasks and cross-references to other activities in case they are needed for their execution. For readability reason, the flow chart is subdivided into several parts. These are accessible in the Annexes (see **Figure A.9.1**, **Figure A.9.2**, **Figure A.9.3**, **Figure A.9.4**, **Figure A.9.5** and **Figure A.9.6**).

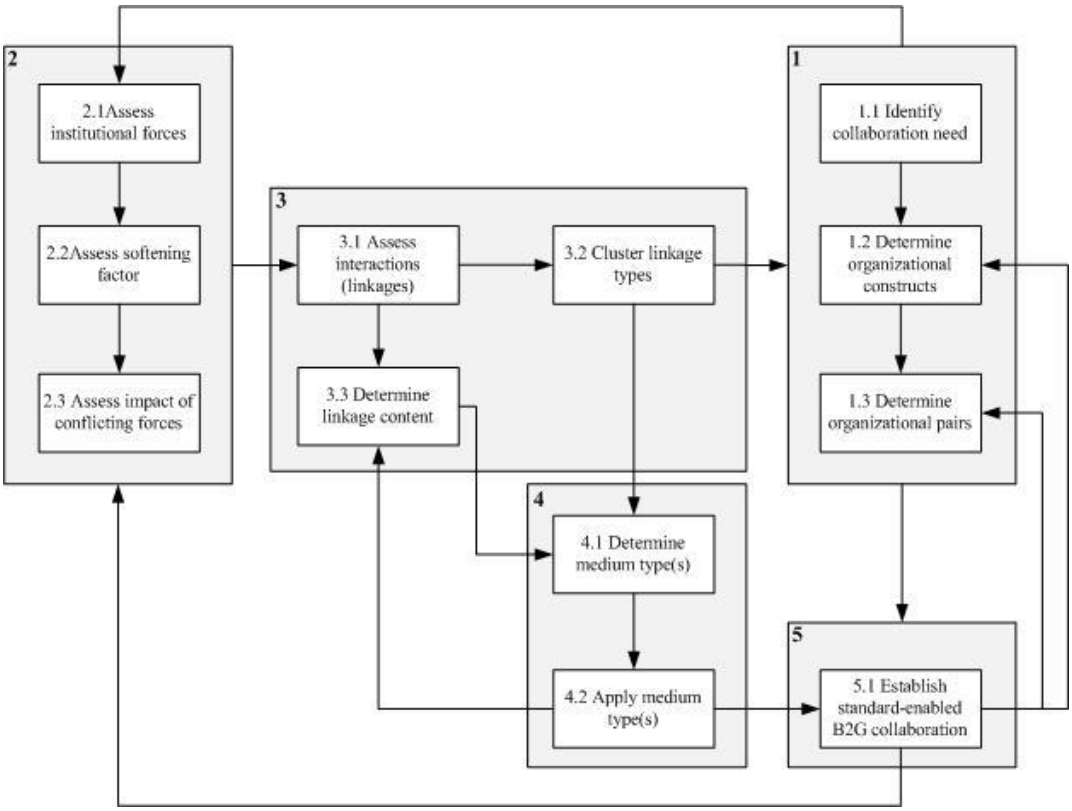


Figure 7.13: Core parts of the B2G Procedure Model

In the following, the explanation of the graphical depiction is described along one flow chart diagram, A.9.1 (see Figure 7.14). A.9.1 concerns the identification and

determination of organizational constructs (Part 1, Task 1). For A.9.1 as well as any of the remaining flow charts, the following guidelines apply.

- Tasks and activities that reference to each of the above-assessed tasks are depicted in a semi-formal and graphical format.
- Tasks are represented as numbered circles
- The order of tasks follows the logic of Parts 1-5 of the procedure model
- Activities are numbered and adhere in numbering to the task they belong to
- References to tasks and activities are graphically depicted by circles with the corresponding number of the task or activity they refer to
- Split into decision options are graphically highlighted including ‘yes’ and ‘no’
- Alternative options are graphically highlighted including ‘or’
- Terminology is based on the terms introduced in Chapter 6
- For simplification purpose, the flow charts do not contain the following notation. The merge of decision options is not symbolized and the merge of alternative options is not symbolized.
- The determination of activities is not symbolized

In A.9.1 thus Figure 7.14, any described activities of Part 1 are arranged in the diagram. It is assumed that one or multiple individuals use the B2GPM flow chart. The organizations they represent are those that are subject to the collaboration. The flow chart for A.9.1 is described in Tables 7.4, 7.5, and 7.6 and should be read as follows:

- Table 7.4 (see **Table 7.4**) lists what needs to be done to initiate B2G collaboration. The list reflects Task 1.1 and activities within the task, namely Activity 1.1.1 that concerns the initiation of the collaboration and Activity 1.1.2 that refers to the application of the pre-formatted collaboration chart. Activity 1.1.2 asks the user of the B2GPM to select the appropriate actor domain. Domains that are available are the business domain (Activity 1.1.2.1), the governmental domain (Activity 1.1.2.2), and the inter-governmental domain (Activity 1.1.2.3). Each of the domains is described in the assessment of organizational constructs. The descriptions are made available in Chapter 6 and herein in **Table 6.5**, **Table 6.6**, and **Table 6.8**. Based on the chosen domain, the user is guided to Task 1.2 (see **Table 7.5**).

- Table 7.5 (see **Table 7.5**) describes how the user is able to determine organizational constructs that are relevant to his chosen domain. Once conducted in Activity 1.2.1, determination of the role of the organization, the user is asked to select the corresponding constructs by executing Activity 1.2.2. Activity 1.2.2 asks him to check the pre-existing collaboration chart and identify the organizational construct that relates to the chosen domain and the organization he represents. In case the organizational construct exists already in the collaboration chart, the user proceeds to Activity 1.2.7 and officially identifies the construct. In case the construct does not exist, the user has the ability to double-check the collaboration chart, determine the reasons for the failed mapping (Activity 1.2.3). The user needs to document the reasons either in case the construct is missing (Activity 1.2.3.1) or other substantial reasons apply (Activity 1.2.3.2). Activity 1.2.4 enables now the user to propose a solution for the missing organizational construct. One example might be to create a new business actor type that is not documented yet in the collaboration chart. This activity is carried out in Activity 1.2.5. The update of the collaboration chart takes place by the user and is reflected in Activity 1.2.6. The creation of organizational constructs has an impact on the pre-existing pairs of organizational constructs that form a collaboration. Therefore, Activity 1.2.5 cross-references to Activity 1.3.2 that ensures that new pairs are to be identified if necessary. Once the organizational construct that corresponds to the organization that initiates the collaboration, the identification of collaborators takes place. This leads over to Task 1.3 and therefore the activities as described in Table 7.6 (see **Table 7.6**).

- Table 7.6 (see **Table 7.6**) supports the user to identify the collaborators with which his organization is collaborating. The corresponding activity is Activity 1.3 (determine organizational pairs). The identification of pairs is carried out in Activity 1.3.1. The user can access the pre-existing documentation of collaborating pairs that are described in Chapter 6 in Figure 6.15 (see **Figure 6.15**) and Table A.9.11 (see **Table A.9.11**) to execute Activity 1.3.1. If the identification of pairs fails, the user is able to extend the list of pairs by identifying new collaborating pairs (Activity 1.3.2). The reason for additionally required pairs results from Activity 1.2.5 and loops back to the above-described cross-reference. Based on the identified pairs, Activity 1.3.3 triggers the identification of linkages thus the mode of operation between the actors (or better organizational constructs) and the content that is subject to the collaboration among actors. To facilitate the identification, a number of resources are made available in Chapter 6: the list of linkage types (see **Table 7.13**) and the list of content types (see **Table 7.15**). The selection of linkage types is documented in Activity 1.3.3.3. If necessary, additional linkage types need to be described and

documented in the pre-existing list thus Table A.9.11. The update is carried out in Activity 1.3.3.1. The selection or better identification of content is documented in Activity 1.3.3.4. If required, an update of the content list takes place in Activity 1.3.3.2. As described in Task 1.3, the reason for collaboration is not only based on the linkage but also the content that is being shared, exchanged, or required. Therefore, Activity 1.3 and its sub-activities ensure the double-checking of the collaboration relevant content. Activity 1.4 concludes the identification of organizational constructs and leads over to Task 2.1.1 that triggers Task 2 and the Activities 2.1, 2.2, and 2.3.

The flow chart diagram and the explanatory notes of Part 1 show that activities, cross-references, and the identification of cross-referenced activities that need to be carried out are easy to detect. The choreography for each of the activities is based on the logic of activities. If activities seem to repeat previous activities, the reason is to double-check the finalization of a previously conducted activity. In particular, as it expected that a number of users apply the flow charts a verification of conducted activities is useful. For the remaining Parts 2 to 5, the flow chart diagrams can be read similar to the above-outlined and in detail explained Part 1. Now, the explanation of the graphical depiction of the procedure model concludes and leads over to Section 7.9.

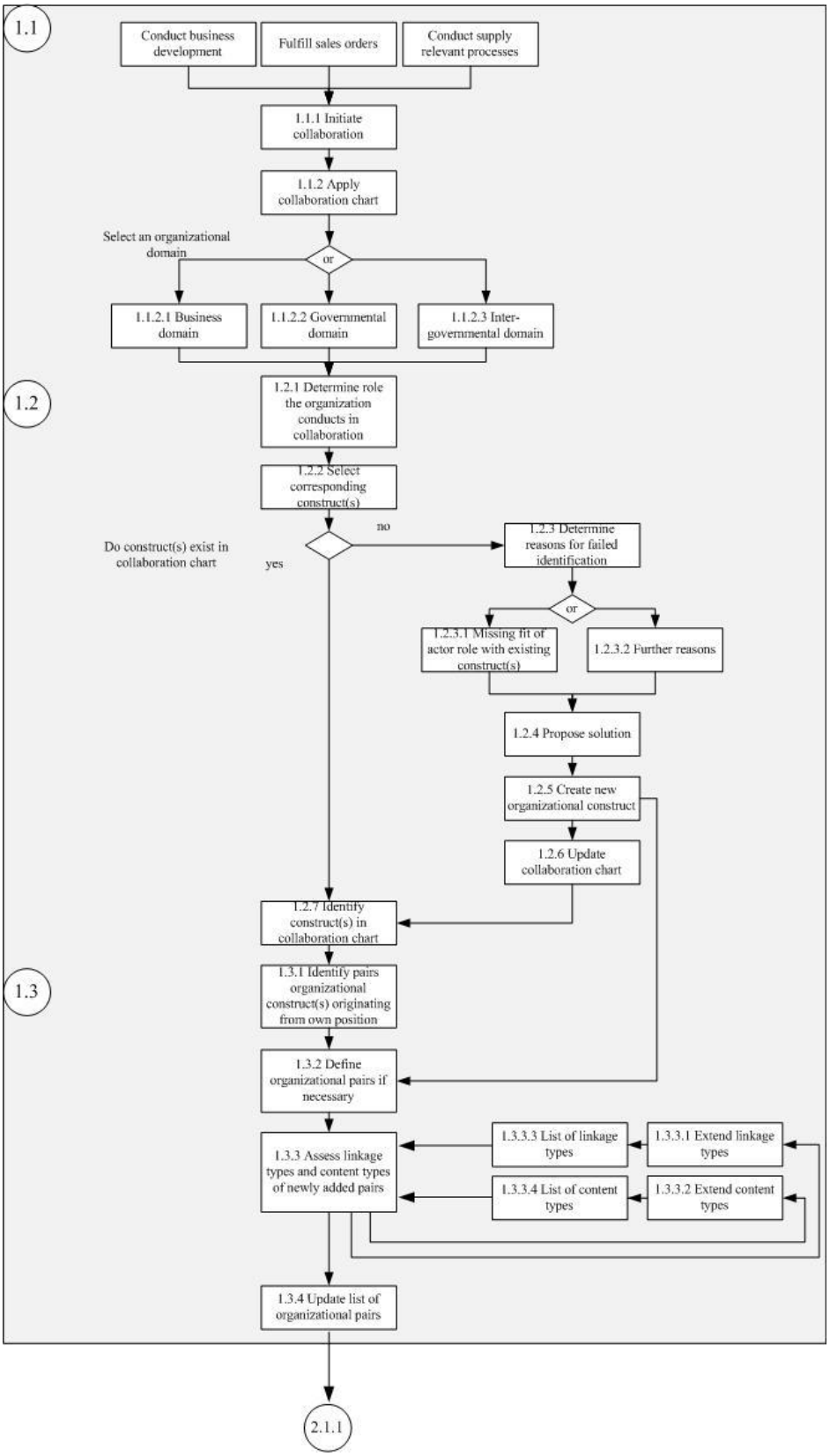


Figure 7.14: Flow of activities in Part 1

7.9 Findings and Learnings from the 2nd Design Round

7.9.1 Introductory Notes

In addition to the learnings and findings of the first round of design, the process of the construction of the standard-enabled B2G Procedure Model (B2GPM) adds to them. If not experienced otherwise, previous findings and learnings remain unchanged. The structure of this section is as follows. For each of the core findings a sub-section introduces findings, clarifies construction results, and points to elements relevant for the procedure model. This section therefore serves twofold: testing the assembly of the organizational and institutional constructs in a clear and systematic manner under the conditions as outlined before (see **Table 6.1** and **Table 7.1**), and providing the ground for a critical evaluation of the design. The remainder of the chapter follows these categories:

- Alignment of the construction of the procedure model to previously identified parts
- Defining tasks and activities
- Determination of outputs
- Assessing roles and responsibilities
- Applying techniques
- Verifying inter-dependencies of tasks

7.9.2 Findings and Learnings

The findings and learnings are as follows.

- Alignment of the construction to previously identified parts

The B2G Procedure Model sets into context the above-identified design principles. The alignment of the elements was based on the design principles. It resulted in a continuous assessment of the design principles along the construction. The learnings from the first round of design helped to refine the construction and to reveal relevant elements to describe the tasks in a uniform, readable, and acceptable manner. Overall, the use of previously identified templates helped to be specific and precise in the description. In

addition, the systematic analysis and the uniformly provided level of detail of the first round of the design eased the ground for the second round of design. The learnings and findings of the first round served as important input to the second round. The evaluation made by standard experts did strengthen the decision to focus on open IS standards as medium types.

- Defining tasks and activities

The identification of tasks and herein activities followed the order that has been revealed in the first round of design. Among the five parts of the model, the identification and determination of the organizational constructs, institutional forces, public processes, and the medium types adhere to the previously defined settings. The establishment of the collaboration was a newly identified task. In addition, the order of that task as last of the five was made intentionally to leverage first the possibility to standardize what can be standardized beforehand and then secondly to make use of the standardization artifacts. Hereby, tasks revealed additional artifacts, the outputs, which complement the overall outcome of this work. With respect to outputs, further learnings are described below in a separate section. Concerning activities, they serve to structure each task by identifying what needs to be done in which order. In this sense, the ordering and numbering of activities throughout the graphical exercise helped to verify the level of detail of activities in the descriptive part. In addition, the refinement of the activity descriptions took place throughout the simulation of the tasks by the researcher and based on grounded experience in the field of collaboration initiation and formation in various assignments.

- Determination of outputs

Outputs in the context of this work are most significant hand-overs from one task or activity to the next one. Hereby, outputs are artifacts that appear to stakeholders as result of a task or the conclusion of one or more activities. Mostly resulting in written documentation, outputs are reusable. It is expected that throughout a repeated use of the procedure model, the level of detail of the outputs and their preciseness will grow. Outputs provide practicability to further actors and ease the communication of the model. Their usefulness needs to be proved over time.

- Assessing roles and responsibilities

Based on a detailed assessment of stakeholders in three distinct networks, the number of distinct roles grounded on that experience. In addition to the sources of the real-world setting, the analysis of additional sources of legislation helped to verify roles and to

distinguish responsibilities of the roles. The detailed analysis of the organizational constructs in the first round of design helped to identify applicable roles for the second round. However, throughout the assignment of activities to roles, additional roles were revealed. Unlike pre-assessed roles in form of acting organizational constructs, the description of the procedure model revealed advising organizational constructs: trade advisors, business advisors, and governmental advisors. The responsibility of advisors concerns a consulting-based approach to verify, explain, describe, and communicate activities of the procedure model to the acting constructs. By this, the utility of the model turns into a consulting instrument that extends the applicability of the model to a broader group of organizational constructs. On the other hand, this approach raises the question of the responsibility of activities and the right of delegating standardization- and regulation-related activities. In case advisors are assigned to the acting organizational constructs, the risk of delegating responsibility or even outsourcing key activities in the field of standardization and regulation maintenance is lowered. At this stage, it requires more case studies beyond this work on the use of the model to verify this assumption.

- Applying resources

The consideration of resources as outlined in **Table 7.3** is the following. Resources support the conduct of activities points to grounded, already applied techniques, tools, methods and further types of references. These are applied in multiple disciplines as for example business process management and standard development. Additional resources as identified in this work complement existing ones mostly in the field of public process analysis and design, the use of IS standards characteristics to identify in-house standardization needs, and extend pre-existing content. Resources in this work are understood as enabler of activities and accelerator that result in a more efficient and effective use of the model. In fact, the proposed resources build largely on pre-existing content. Additional learning for collaborating constructs therefore is reduced to an optimum.

- Verifying inter-dependencies of tasks

It was found useful along the construction process to add the element of dependent tasks. Firstly, usefulness was sensed by having identified the inter-relatedness of tasks and activities. Secondly, usefulness was sensed by having made the description better readable. Thirdly, the graphical depiction of the model revealed the need to align dependent tasks and activities and therefore illustrate the order of tasks in form of numbers. Inter-dependencies of tasks were verified in the process of transforming the

descriptive elements of the model into a graphical depiction of the model. The transformation itself proved the level of detail on activity level right. It allowed denoting decisions to be made. The outline of the activities to resolve conflicts among contradicting or competing institutional forces is illustrated better in the graphical flow than throughout the descriptive part. Hereby, the use of the graphical flow is recommended. It supports stakeholders to resolve the conflict and points to key issues.

7.10 Evaluation of the Standard-enabled B2G Procedure Model (B2GPM)

7.10.1 Introductory Notes

This section covers the evaluation of the second round of design. The evaluation of the first round of design took place by reflecting stakeholder needs and the real-world setting. In this section, the evaluation consists of the following parts:

- Evaluation based on the claimed collaboration need and the derived design principles
- Evaluation based on modeling guidelines
- Evaluation based on a conducted experiment
- Evaluation based on the comparison of the B2GPM with another procedure model
- Evaluation based on the utility of the artifact to be reused and the research results to be clearly communicated

7.10.2 Evaluation against the Design Principles

The design principles that led to the construction of the procedure model are derived from the analysis of related work and the expressed collaboration needs in the reference framework. Requirements that drive the design of the collaboration are:

1. Actors are being identified if not already known based on longterm collaboration. They participate in the described collaborations from distinct countries within and outside the European Union. Each of the actors pursues a dedicated set of activities and tasks that are being assessed in the along the case study. Role definitions and assignments are clear. Each of the actors is aware of the procedural tasks he needs to

conduct. Actors need to be aware of regulatory requirements they need to be compliant with.

2. Actors need to expand their awareness on regulatory requirements and compliance needs. Furthermore, regulation-imposed IS needs in form of data provision, electronic declarations and statements are to be followed. These are caused by local and foreign governmental decisions. Actors are hesitant to implement new procedures if value proposition is unclear and former processing is still possible.

3. The proposition of a reference process is useful if it is applicable to multiple networks. It fosters the identification of tasks and activities in one network and the comparison of similar tasks and activities in further networks. The reference process should embrace regulatory requirements, documents, official forms and certificates. A detailed outline of the reference process is sensed useful to the networks to be followed. The reference process connects procedural steps and roles of actors.

In accordance to the collaboration needs the B2G Procedure Models aims to enable inter-organizational collaborations among business and governmental actors in the field of export. The design principles of the B2G Procedure Model that derived from the first round of design are as follows:

- The scope of B2G relevant activities is set through the definition of the organizational field. Actors (henceforth organizational constructs) that identify collaboration opportunities in trade should determine the organizational field(s) in which they would like to or need to participate. For modeling purposes, the organizational field forms through pre-defined number and characteristics of organizational constructs.

- B2G collaboration consists of collaborating pairs formed out of business, governmental, and inter-governmental organizational constructs. Organizational constructs operate on distinct levels such as organizations and organizational populations. B2G distinguishes three types of organizational constructs: business, governmental, and inter-governmental constructs.

- B2G interactions base on 21 linkages types that describe interactions between business and governmental constructs. Content describes the purpose of interaction. Seven content types apply to B2G. They transmit through so-called medium types, applying distinct format types.

- B2G initiates through institutional forces that are compliance and governance based. Any linkage type and content is part of institutional context: national and supranational regulations as well as inter-governmental conventions and recommendations. Dependencies between governmental and inter-governmental constructs influence B2G activities to national transposition differences. The transposition distinguishes 100% transposed and partly transposed. 100% transposition relates to conventions and recommendations that turn into a legally binding institutional act without alterations. Any convention that has a transposition below 100% is softened. The so-called softening factor results in a non-legally binding, supplementing recommendation. Actors in B2G should be aware of the softening factor that will result in different application procedures for an institutional force on the receiving end of collaboration. In addition, a review of institutional change is necessary to keep institutional forces up-to-date and actors informed.

- Terms and terminology are publicly made available. They follow the principle of uniquely defined and unambiguous definitions. Terms and terminology are shared among actors and accessible to those actors that do not participate yet in the organizational field.

- Medium types vary

- The preferred medium type where applicable is electronic. The format of electronic medium is standardized and specified where applicable.

- Applicable to the organizational field of trade and herein customs specific activities

- Check applicability to other organizational fields.

The following table 7.19 lists each of the design principles and evaluates if the procedure models meets them. If relevant, the evaluation adds explanatory comments to the criteria and reflects on learnings and limitations that were experienced throughout the construction of the procedure model. The degree of fulfillment is measured against ‘met’ (criterion is met) and ‘not met’ (criterion is not met) and depicted graphically in form of a full circle (criterion is met) and empty circle (criterion is not met). Limitations (criterion is partly met) that were experienced throughout the construction are added to the explanatory comments and are illustrated with a half-full circle in Table 7.19. The explanatory comments are not being repeated, but remain in the table for easier referencing.

Table 7.19: Design principles-based evaluation results

Design principles for standard-enabled B2G collaboration formation and corresponding criteria		Explanatory comments to the left-hand column and where experienced limitations and learnings of the criteria are added	Evaluation result
1. Design of the organizational field			
1.1	The identification of an organizational field is influenced by collaboration-seeking actors (=organizational constructs)	The scope of B2G relevant activities is set through the definition of the organizational field.	●
1.2	The formation of the organizational field is determined by a pre-defined number of organizational constructs and their characteristics	This has been proved based on the previous described collaboration needs.	●
2. Design of collaborating pairs			
2.1	B2G relevant operations are taking place on distinct levels of operations	B2G collaboration consists of collaborating pairs of business, governmental, and inter-governmental organizational constructs.	●
2.2	Organizations are assigned to one of three organizational construct types: business, government, or inter-government.	This proved to be applicable in the modeling process.	●
3. Design of inter-organizational operations			
3.1	21 linkages types describe interactions between business and governmental constructs	Extension of linkages types is possible if inter-organizational collaboration needs are not met.	●
3.2	Content describes the purpose of the interaction; seven content types are applicable	Extension of content types is then necessary if content requirement do not fit to the pre-formatted content types.	●
3.3	Medium describes in which format and by which technical mean content is transmitted	The baseline of the selection of formats is based on regulatory requirements and the recommendation of the designer of the procedure model.	●
3.4	The preferred medium type is electronic	The selection of the electronic format is based on regulatory requirements and the recommendation of the designer of the procedure model.	●
3.5	The format of the electronic medium applies the guidelines of a IS standards framework	The observation of three distinct networks showed the potential of the applicability of the IS standards framework. It requires more insights into their applicability in further cases and tests.	◑
4. Determine the institutional context			
4.1	Determine the institutional forces on national, international, and inter-governmental levels	The assumption for this design principle derives from the observed networks and therefore underlying regulations. Further studies are recommended.	◑

4.2	Determine the degree of transposition	Actors that apply to any of the WCO members experience the phenomenon of the degree of transposition.	●
4.3	Assess the softening factor	The concept of the softening factor is firstly introduced in this work. Further studies will outline its usefulness.	●
5. Glossary of terms and terminology			
5.1	Unambiguous definition of terms and terminology	The design elements of the procedure model are defined and unambiguously applied in this work.	●
5.2	Publication of terms and terminology that are accessible to participating and non-participating actors	The first communication relates to the publication of this work. Further publication potential derives from the use of this work in other studies.	◑
6. Determine communication strategy among actors			
6.1	to communicate institutional change	Using the B2GPM, one option that is offered to communicate institutional change concerns the assessment of institutional forces, publish changes in the content list, thus the procedure model, and hereby make actors aware of the change.	◑
6.2	to communicate the softening factor	The B2GPM disclosed a need to assess the softening factor. Further studies are needed to prove its usefulness in conflicting institutional forces. One option to publish it is through supplementing material that accompanies regulations and directives.	◑
6.3	to communicate the degree of transposition	The procedure model disclosed a need to assess the degree of transposition for B2G collaborations. It reflects the deployment of institutional change. Through the B2GPM, one option that is offered to communicate institutional change concerns the tasks to re-assess the institutional forces from the viewpoints of the participating governmental actors.	◑

● Criterion is met ◑ Criterion is partly met ○ Criterion is not met

The evaluation shows that the procedure model followed each of the design principles. It proves the applicability of the design principles and their usefulness to the construction of the procedure model. The procedure model lacks due to its focus on the phase of construction experiences in the communication to external parties. Further studies will prove how to define and refine a proper communication strategy. They can also disclose if the evaluation criteria are sufficient or need to be modified.

7.10.3 Evaluation based on Modeling Guidelines

One mean to evaluate the procedure model is the comparison of the model with other models by applying pre-existing quality assurance criteria (cf. Hevner, March, Park, & Ram (2004), p. 86). In the following, the procedure model is quality assured. The comparison and contrasting with other models is subject to the subsequent section.

With respect to quality assurance measures, any construction of a procedure model needs to consider the task of quality assurance (cf. Susman & Evered (1978), p. 582-584). Guidelines that aim for the quality assurance of procedure models are available (cf. Kelter (2007), p. 6-8). One concept is proposed by the Guidelines of Modeling (GoM). GoM were introduced by the University of Münster and associated researchers of the Faculty of IS (cf. Becker, Rosemann, & von Uthmann (2000), p. 31; Rosemann & Schütte (1997)). The objective of GoM is to assure the quality of procedure models and introduce recommendations for the development of procedure models. It pursues that aim in issuing six guidelines that are as follows (cf. Becker, Rosemann, & von Uthmann (2000), p. 32-33):

- The guideline of correctness: It requires the proposition of an output-oriented meta model and that the structure and expected behavior of the model are consistent with the original. Syntactic correct procedure models are to be consistent and complete against the meta model.

- The guideline of relevance: It requires basing the procedure model on a relevant object system, using a relevant modeling technique as for example a data flow chart, and developing a relevant model. Each of the elements that are part of the procedure model proves relevant if their exclusion hampers the use of the model.

- The guideline of economic efficiency: This criterion proves the applicability of cost-benefit constraints of the model. Where possible recommendations that relate to the economic feasibility of the model are provided.

- The guideline of clarity: The model needs to be readable, understandable, and useful. Clarity avoids that the model gets overloaded. Organizational constructs are clearly defined. Inter-organizational constructs and additional elements that are relevant for B2G collaboration formation are defined within and not outside the model.

- The guideline of comparability: It demands that the design principles within the modeling are consistently used. Design principles derive from the analytical, yet diagnostic assessment of the selected original. The procedure model assures that tasks and activities are described in a conform manner. Comparability allows comparing the modeling results that originate from originals that follow the procedure model.

- The guideline of systematic design: Organizational and interaction relevant constructs are well-defined. Interrelationships among constructs base on inter-organizational processes and are defined in a systematic manner. It is recommended to ensure a uniform description of task details, output, roles, resources, description, and activities for each of the tasks, each part and corresponding tasks within the model.

The evaluation is now being conducted as follows. Following the above-detailed description, Table 7.20 lists the criteria for each of the GoM and if relevant, it adds explanatory comments to the criteria and reflects on learnings and limitations that were experienced throughout the evaluation cycle. The degree of accomplishment is measured against ‘accomplished’ (evaluation passed) and ‘not accomplished’ (evaluation failed) and depicted graphically in form of a full circle (evaluation passed) and empty circle (evaluation failed). Limitations (evaluation partly passed) that were experienced in the evaluation are added to the explanatory comments and are illustrated with a half-full circle in Table 7.20. The explanatory comments are not being repeated, but remain in the table for easier referencing.

Table 7.20: GoM-based evaluation results

Guidelines of Modeling (GoM) and GoM-based evaluation criteria		Explanatory comments to the left-hand column and where experienced limitations and learnings of the criteria are added	Evaluation result
1. Guideline of correctness			
1.1	An output-oriented meta model is provided		●
1.2	The structure and behavior of procedure model are consistent with the original	Consistency refers to the design principles that need to be fulfilled in the transformation of the original to the model. The transformation is of homomorph nature. Limitation / learning: the procedure model is a result of an action-research driven approach that concluded through learning and participatory research activities in reiteration.	●
1.3	The procedure model is syntactically correct against the meta model	Syntactic correctness proves the tasks and activities to follow the overall syntax of the meta model.	●
2. Guideline of relevance			
2.1	A relevant object system is in use	Relevant and essential elements are part of the procedure model.	●
2.2	A relevant modeling technique is in use	Data flow chart technique is being used.	●
2.3	Each of the object system elements that are part of the procedure model proved relevant	Unnecessary elements are scoped out. Relevant and essential elements are part of the procedure model.	●
2.4	Elements that proved relevant to the procedure model and were not part yet of the model were added to the model	This criterion ensures the learning aspect of the procedure model. The amendment of the model took place along the assessment of criteria 1.1 - 1.3 and 2.1 - 2.3.	●
3. Guideline of economic efficiency			
3.1	Cost-benefit constraints are applicable to the procedure model	The model proves to have a positive impact on B2G collaboration formation. The exclusion of economic and monetary factors in the case study requires further assessment of cost-benefit constraints and variables.	○
3.2	Further recommendations on the economic feasibility of the model are provided	Limitation / learning: the proof of economic feasibility is limited in this stage of the introduction of the procedure model. A Total-Cost-of-Ownership (TCO) assessment is recommended. In addition, further tests in real-life settings are highly recommended.	◑
4. Guideline of clarity			

4.1	The model is readable, understandable, and proved useful	The model points to tasks and activities in a clear manner.	●
4.2	Organizational constructs are clearly defined	Organizational constructs are not overlapping, hence specifying the same objects.	●
4.3	Inter-organizational constructs are clearly defined	Inter-organizational constructs are not overlapping, hence specifying the same objects.	●
4.4	Additional constructs that proved relevant are defined	This criterion corresponds to the criterion 2.4.	●
5. Guideline of comparability			
5.1	The design principles within the modeling are consistently used	The design principles represent the guidelines that resulted from the diagnosis of the original. They are the conditional framework for an institution-based and standard-enabled B2G collaboration formation.	●
5.2	Tasks and activities are described in a conform manner	Being used in different parts of the procedural model, tasks and activities are unambiguous defined.	●
5.3	Tasks and activities within the procedure model are comparable (connectable) to the original	Tasks and activities in the procedure model follows the original aim. Limitation / learning: the procedure model is a result of an action-research driven approach that concluded through learning and participatory research activities in reiteration. Additional activities and tasks resulted from newly identified activities in the modeling process and are clearly outlined in a separate learning section to be reflected against the original.	◑
6. Guideline of systematic design			
6.1	Organizational and interaction-relevant constructs are well-defined	This criterion corresponds to the criteria of 4.2 and 4.3.	●
6.2	Interrelationships among constructs are based on inter-organizational processes	This criterion ensures the applicability of the public process concept.	●
6.3	Interrelationships among constructs are defined in a systematic manner	Systematic is defined in the sense that a coherent technique is applied for all interrelationships.	●
6.4	Tasks, output, roles, resources, and activities are defined in a uniform manner	A template-based approach supports the uniform definition of tasks. The template is coherently used in all parts of the procedure model.	●

● Evaluation passed ◑ Evaluation partly passed ○ Evaluation failed

The evaluation shows that the procedure model meets the Guidelines of Modeling (GoM). Partly met criteria of the procedure model refer to the guideline of economic efficiency: a re-use of pre-existing knowledge, formatted and even standardized content proved in related work of business-to-business scenarios their economic efficiency and value. Pre-requisites for further studies will include the specification of application and maintenance costs of the procedure model. It further includes an assessment of adoption and deployment efforts of the procedure model. To-date studies and related work are made available for example by Boer and van Engers (Boer & van Engers (2001)) and Otto and Antón (Otto & Antón (2007)). Both research studies concern the effort of legislation modeling and adoption. The assessment of the procedure model will then require becoming part of further B2G studies and studies concerning IS standardization. Another partly met criterion in the evaluation process refers to the question if the procedure model followed the original aim. The learning that was experienced along the construction of the procedure model concerns additional activities and tasks from newly identified activities in the modeling process. Therefore, the original aim was followed. It concluded in one reiteration of the construction process. The learnings from the reiteration are documented in Section 6.4 (see Section 6.4).

7.10.4 Evaluation based on a Conducted Experiment

The Guideline of Comparability recommends a test cycle in which the procedure model is being tested against an original. The following scenario has therefore been selected and used as an experiment to test the use of the procedure model. The scenario is as follows. A German manufacturer is seeking an export-focused collaboration with a Canadian customer. Based on the relevance of individual activities and decisions, the number of conducted activities is equal or smaller than the number of activities introduced in the procedure model. The evaluation bases on one selected interaction type and content type. The manufacturer in this example fulfills the roles ‘declarant’ and ‘consignor’. Hence, the collaboration focuses on the interactions of the manufacturer. The application of the procedure model results in artefacts. They are described in the following listing. For readability reasons, each bullet point covers a task and the relevant activities. The numbering of the tasks and of the activities corresponds with the numbering of the tasks and of the activities that are used in the graphical depiction of the procedure model (see Section 7.8). Comments complement the description of artefacts where relevant and useful for further understanding of the scenario testing. The explanatory comments are not summarized at the end of this section, but remain in the listing for easier referencing.

- Results of Task 1.1 and Activity 1.1.1: The collaboration concerns a sales order for export of manufactured goods from Germany to Canada.

- Results of Task 1.2 and Activities 1.2.1 and 1.2.3: The organizational domain is identified. The organizational constructs are as follows. The business domain consists of the German manufacturer (BO1) that represents the declarant (BO2) and the consignor (BO3). The business organizational population is BOP1 representing all German manufacturers. The governmental domain is represented by the German customs administration (GO1) and the Canadian customs administration (GO2). For simplification reasons the BOs are aggregated to BOPs.

- Results of Task 1.2 and Activity 1.2.7: The necessary constructs are existing and were identified in the pre-existing collaboration chart (Figure 7.14).

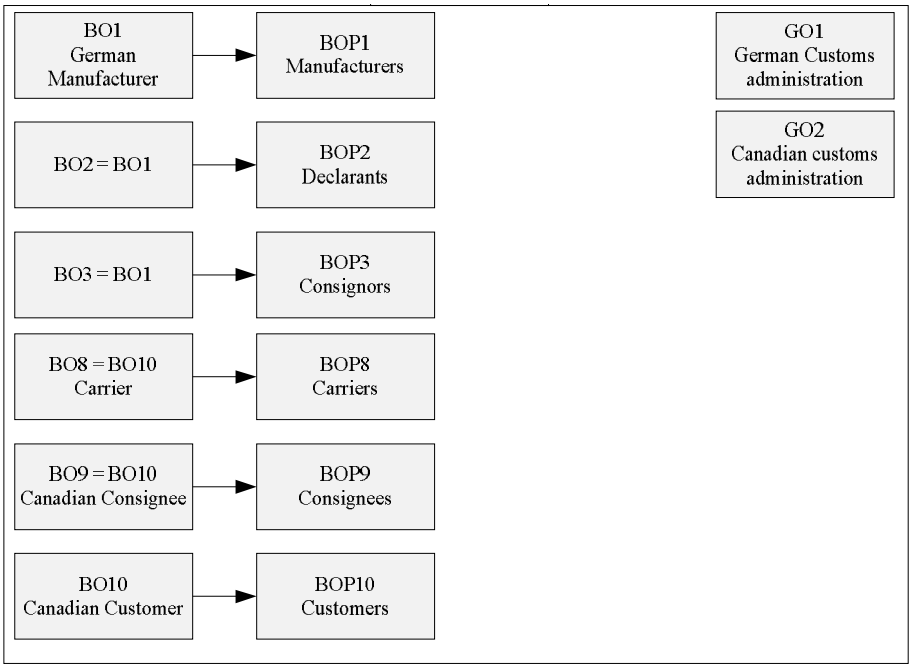


Figure 7.15: Identified organizational constructs

- Results of Task 1.3 and Activity 1.3.1: The identified pairs of BO1 are as listed in Figure 7.15. Additional pairs were not detected in the collaboration.

From	To
BOP1	GO1
	GO2
	GO10
	GOP5
	GOP7

Figure 7.16: Identified interaction from a business point of view

- Results of Task 1.3 and Activity 1.3.4: The list of organizational pairs is the actual one.

- Results of Task 2.1 and Activity 2.1.1: The regulatory sources are up-to-date. The alignment with national and foreign customs advisors eased the assessment of legislation changes.

- Results of Task 2.1 and Activities 2.1.4, 2.1.5 and 2.1.6: The supranational legislation is applied for BOP1 (Figure 7.16). Further inter-governmental sources are checked. The prioritization is following pre-existing order.

European Community Treaty "Article 133 Committee"	Legislation	Supranational
Lisbon agenda	Legislation	Supranational
Electronic Customs Decision	Legislation	Supranational
Commission Communication of 26th September 2003; COM (2003) 567 (e-Government)	Legislation	Supranational

Figure 7.17: Identified legislation forms

- Results of Task 2.2 and Activity 2.2.1: The German legislation passes the bill and applies to 100% the Revised Kyoto Convention and the UN/CEFACT / WCO Data Model. The Canadian legislation passes the bill and applies to 100% the Revised Kyoto Convention and the UN/CEFACT / WCO Data Model. Additional procedural requirements are not necessary, as softening factor does not exist.

- Results of Task 2.2 and Activity 2.2.4: The list of institutional forces has been checked. No changes occurred. The list is up-to-date.

- Results of Task 2.3 and Activity 2.3.2: National procedural requirements follow the SAFE export procedures and promote UN/CEFACT as meta-standard. There is an intra-organizational conflict because of the product portfolio of BO1: BO1 trades further product types. The export processing is partly applying a vertical standard

that is not SAFE and UN/CEFACT compliant. The identified conflict has an impact on application engineering and the decision upon which standard to use. This activity relates to Activities 5.1.4 to 5.1.7. The Canadian procedural requirements follow SAFE import procedures and promote UN/CEFACT as meta-standard.

- Results of Task 3.1 and Activity 3.1.1: Pre-existing interactions are applicable to the assessed scenario as presented in Figure 7.17. The identification of interactions in the test allowed the identification of already existing linkage types. Thus, linkages are also linkage types.

From	To	Linkages
BOP1, BOP2, BOP3	GOP7	check
BOP1	GO1	exchange
BOP1, BOP2, BOP3	GO1, GOP5	get access to
BOP1	GO1	give access
BOP2	GO1	confirm
BOP2	GO1	provide
BOP1, BOP2, BOP3	GO2	submit
BOP1, BOP2, BOP3	GO10	submit
BOP1, BOP3	GO1	submit
BOP2	GO1	submit
BOP2	GO1, GO10	submit
GOP7	BOP1, BOP2, BOP3	accredit
GOP9	BOP1	allow
GO1	BOP1	conduct
GOP7	BOP1, BOP2, BOP3	ease
GOP7	BOP1, BOP2, BOP3	facilitates
GOP7	BOP1, BOP2, BOP3	issue
GOP7	BOP1, BOP2, BOP3	issue
GOP7	BOP1, BOP2, BOP3	issue
GOP9	BOP3	issue
GO1	BOP11, BOP2	release
GO1	BOP2	verify

Figure 7.18: Identified pairs of interaction and un-classified linkages

- Results of Task 3.1 and Activity 3.2.1: The identification of the interaction types is complete. The result is illustrated in Activity 3.3.1.

- Results of Task 3.1 and Activity 3.3.1: The interaction types are as follows. The following list (see Figure 7.18) illustrates the content that is transmitted via linkages. So far, 12 interactions have been identified among actors.

From	To	Linkage content
BOP1, BOP2, BOP3	GOP7	trade relevant activities that relate to export from GOP7
BOP1	GO1	data, accompanying documents, decisions, and notifications
BOP1, BOP2, BOP3	GO1, GOP5	customs declaration related information
BOP1	GO1	customs declaration related information
BOP2	GO1	origin of goods
BOP2	GO1	IT application for customs declaration process
BOP1, BOP2, BOP3	GO2	customs declaration related information
BOP1, BOP2, BOP3	GO10	export and import relevant data
BOP1, BOP3	GO1	export and import relevant data
BOP2	GO1	pre-departure declaration
BOP2	GO1, GO10	import and export relevant data, electronic certificates
GOP7	BOP1, BOP2, BOP3	AEO status

Figure 7.19: Identified interactions and content

- Results of Task 3.1 and Activity 3.3.5: The content format of the to-be-exchanged customs declaration as part of the result of Activity 3.3.1 could follow an electronic customs data set. One instance of an electronic customs data set has been based on the Single Adminstrative Document (SAD). This data set has been tested in the ITAIDE project. A detailed documentation is made available by (Flügge, B., Sassen, & Schmidt (2007)). An extract of the proposed electronic customs data set is illustrated in Figure 7. 19.

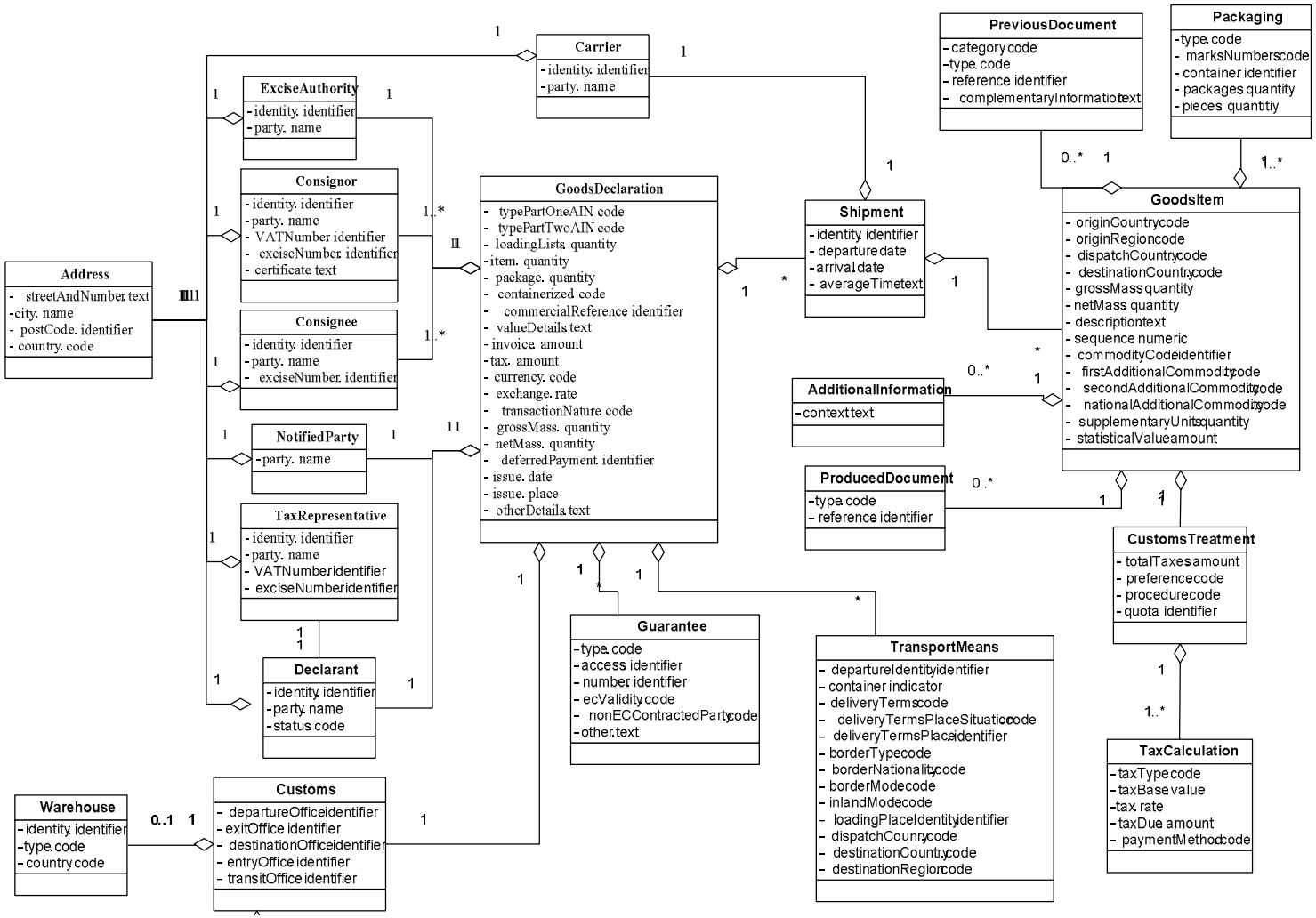


Figure 7.20: Electronic customs data set in use

- Results of Task 4.1 and Activities 4.1.1, 4.1.2, 4.1.3 and 4.1.4: The following medium types are identified for the governmental and business constructs (Figure 7.20): IT-enabled, physical, and paper-based.

From	To	Medium types
BOP1	GO1	IT-enabled
BOP1	GO1	IT-enabled
BOP1, BOP2, BOP3	GO1, GOP5	form-based, IT-enabled
BOP1, BOP2, BOP3	GO10	IT-enabled
BOP1, BOP2, BOP3	GO2	form-based
BOP1, BOP2, BOP3	GOP7	IT-enabled
BOP1, BOP3	GO1	IT-enabled
GO1	BOP1	physical
GO1	BOP11, BOP2	IT-enabled
GO1	BOP2	physical, IT-enabled
GOP7	BOP1, BOP2, BOP3	IT-enabled
GOP7	BOP1, BOP2, BOP3	IT-enabled
GOP7	BOP1, BOP2, BOP3	IT-enabled
GOP7	BOP1, BOP2, BOP3	paper-based

Figure 7.21: Identified interactions and medium types

- Results of Task 4.1 and Activity 4.1.5: Customs procedure is standardization relevant and leads over to content type in activity 4.1.6. The assessment of the medium types shows a conflict in identical pairs but different medium types with respect to customs procedure. The pairs apply on the one hand paper-based and on the other hand IT-enabled medium types.

- Results of Task 4.2 and Activity 4.2.1: The following prerequisites for standardization and harmonization of conflicting customs procedures were identified. Public processes are defined and modeled from national and foreign procedural perspective. An involvement of customs and trade engineers is required. The procedural aspects refer to intra-governmental legislation conflicts. A clarification from legislation perspective is required.

- Results of Task 4.2 and Activity 4.2.2: The example as provided in Figure 7.21 illustrates how the modeling is being conducted. Modeled top-down, the modeling starts with linkage types and results in content-based interaction. A detailed documentation of the modeling result is available in (Flügge, B., Sassen, & Schmidt (2007)). The applicability of the modeling method, the UN/CEFACT Modeling Methodology (UMM) has been assessed in (Flügge, B. & Stuhec (2006, 2007)).

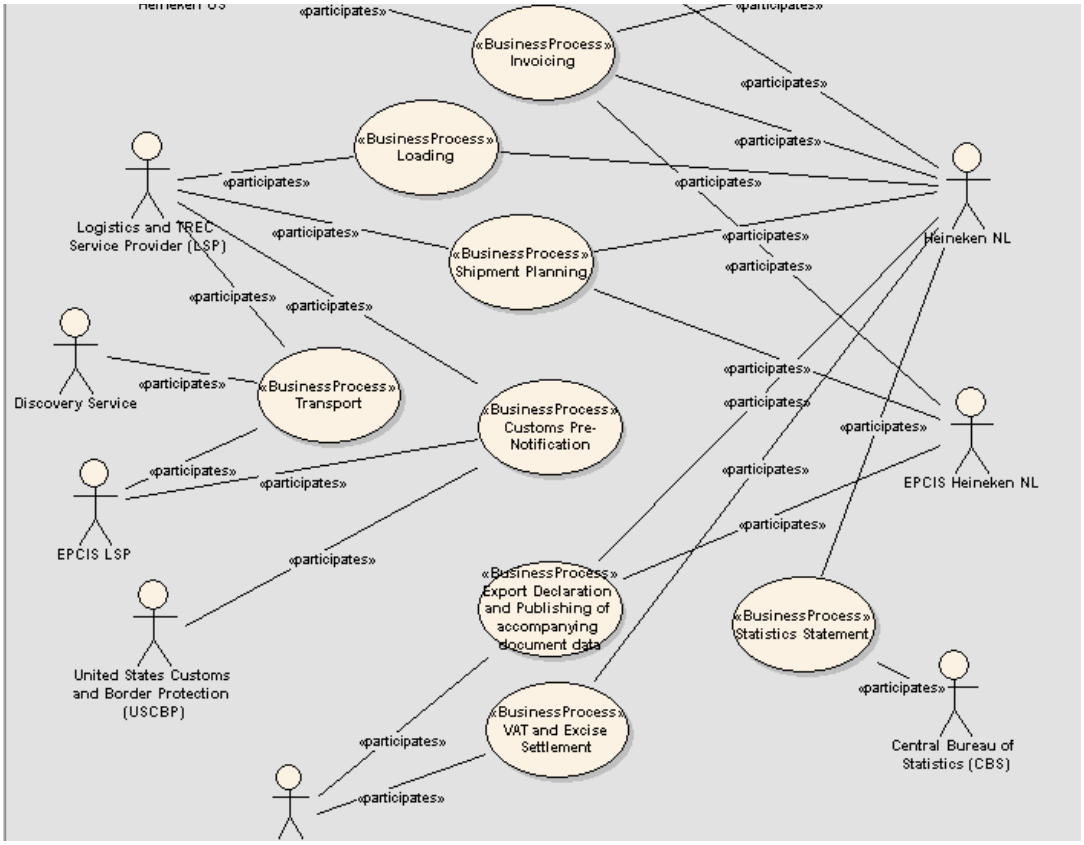


Figure 7.22: Exemplified public process modeling

- Results of Task 4.2 and Activity 4.2.2: One of the pre-formatted data dictionaries that are available to actors is illustrated in Figure 7.22. Figure 7.23 illustrates the use of the data dictionary for customs. It illustrates the data elements as provided by UN/CEFACT based on the content structure for an export declaration.

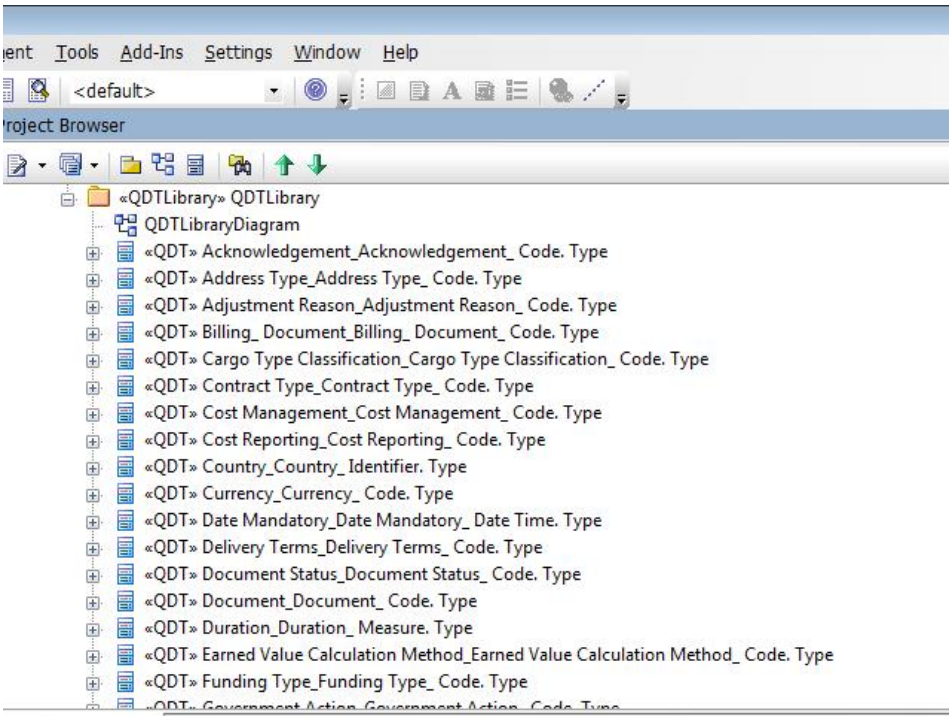


Figure 7.23: Extract of a pre-formatted data dictionary

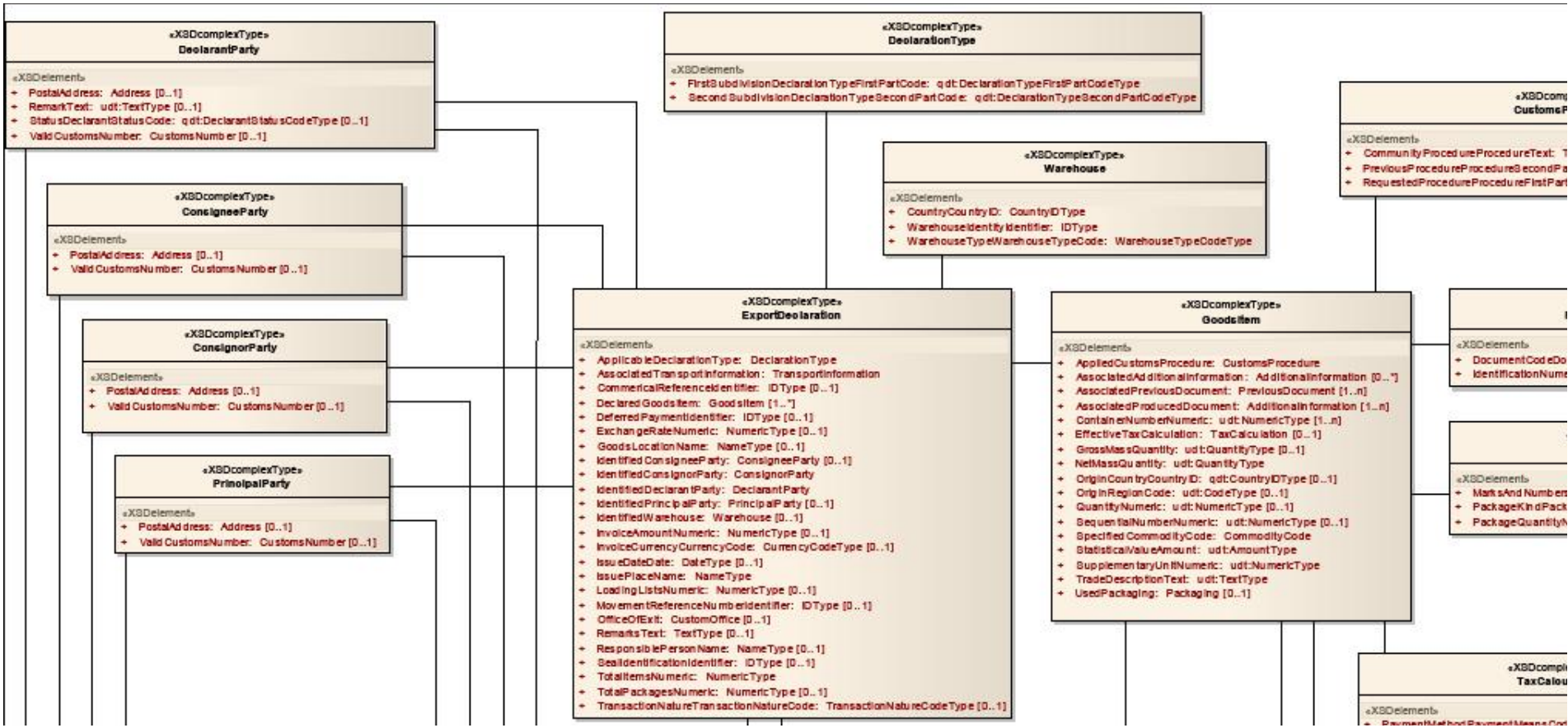


Figure 7.24: Example of an export declaration using a pre-formatted data dictionary

- Results of Task 5.1 and Activities 5.1.1 and 5.1.6: Based on the results of Task 4.2.2 the standardized content is being issued to the participating actors.

- Results of Task 5.1 and Activity 5.1.2: The publishing party needs to make sure that the modeling result is made accessible to any actor (BO1, BO2, BO3, BO10, GO1, and GO2).

- Results of Task 5.1 and Activity 5.1.3: The following coordination needs were identified: between UN/CEFACT and vertical standard development organization. Between national and foreign legislation to prevent deployment conflicts of 100%-transposed bills and between intra-organizational application engineers and standardization engineers.

- Results of Task 5.1 and Activities 5.1.5 and 5.1.7: The hereby-tested use of the procedure model and end-to-end standardization reveals further need of actors. Legislation engineers, trade and customs engineers, clearing stewards, standardization engineers that abstract from vertical standards to a meta-standard, and application engineers that apply the meta-standard rather than focusing on proprietary standards. This activity has a major impact on the success of standard-enabled collaboration between governmental and business actors. Organizations decide among non-standard based applications, vertical standard based applications, and meta-standard based processes, messages, and data.

- Results of Task 5.1 and Activity 5.1.7: The recommended internalization of a standard, in this case the UN/CEFACT standard, is relevant to the organizational constructs BO1, BO2, BO3, GO1, and GO2. The disclosed conflict in Activity 2.3.2.1 requires intra-organizational resolution. Herein, the internalization of UN/CEFACT based standards affect governmental actors as well.

The above-outlined experiment disclosed a number of assumptions and considerations in addition to those that are included in the description of the tasks. Despite the focus on B2G collaboration, the impact on intra-organizational decision-making processes concerning standard usage and modeling activities is apparent from the example. A key success factor to test and deploy the model further is how organizations proceed with the internalization of the relevant activities.

Furthermore, the internalization of the meta-standard as proclaimed in this work, affects the standardization industry. The term standardization industry in this dissertation refers

to all SDOs and other organizations that are involved in standardization. The term standardization industry subsumes any actors involved in the process of standard development and publication. The internalization of the meta-standard on the standardization industry needs to cope with the following aspects:

- Impact of meta-standard on scope and portfolio of vertical standard development organizations,
- Impact on standard engineering activities from vertical and cross-sectoral (meta-standard) perspective,
- Impact on institutional forces and content modeling to include relevant meta-standard elements,
- Impact on national governance frameworks and IT-program management initiatives such as the MASP initiative,
- Retrieval of existing standardized content repositories,
- Establishing a concerted, collective action to standardize content repositories from an intra-governmental and / or governmental organizational population point-of-view,
- Alignment of meta-standard deployment with national and local standard development activities, and
- Initiation of a conflict mitigation process to address safeguarding conflicts of business, governmental, and inter-governmental actors.

The deployment of the procedure model will require several iterations to retrieve existing and standardize missing content and publish it to the participants in the organizational field of export. Elements concerning interoperability are available in the form of an interoperability roadmap that combines ERP-specific elements and procedural aspects (Flügge & Schmidt (2009)). The above outlined example demonstrated that the procedure model is applicable for individual actors, interactions, and related content in any region. It facilitates the focus on pre-selected interactions and content types.

7.10.5 Evaluation based on Comparison

With respect to the evaluation of the procedure model, it is expected to evaluate the procedure model and compare it with other models (cf. Hevner, March, Park, & Ram (2004), p. 86). The choice of procedure models that are applicable to contrast the B2G Procedure Model depends on the availability of other models. The comparison of networks in the previous section showed that a number of models are available. However, the inter-organizational aspects of collaboration are limited in these models. A further assessment revealed that the business process management lifecycle model (BPMLM) as proposed by Theling is appropriate to be applied. Its appropriateness to serve as basis for the evaluation grounds in its objectives: it aims to facilitate inter-organizational collaboration by proposing a "distributed repository managing all required data and information, which especially obtains process-oriented view on collaboration networks" and by stating that "cross-organizational processes need close coordination among network partners" (Theling, Zwicker, Loos, & Vanderhaeghen (2005), p. 169). Prior to the design of their model, Theling et al. conducted a thorough analysis and synthesis of related work (cf. Theling, Zwicker, Loos, & Vanderhaeghen (2005), p. 169-170).

The procedure model of (cf. Theling, Zwicker, Loos, Adam, & Hofer (2005); Theling, Zwicker, Loos, & Vanderhaeghen (2005)) is now described phase by phase. The comparison with the B2G Procedure Model (B2GPM) follows thereafter.

The BPMLM is composed of six phases: collaboration initiation (Phase 0), collaboration formation (Phase 1), local to-be concept (Phase 2), global to-be concept (Phase 3), local implementation (Phase 4), and collaboration execution (Phase 5). In phase 0, actors make themselves aware of the collaboration need. The collaboration is purpose driven. The underlying assumption to join collaboration is an economic benefit that is being perceived by the actors. More than two actors participate in the collaboration. Each actor provides competence to the collaboration. The initiation phase informs actors about the distinction of public-private viewpoints by which joint business process knowledge and the internal know-how of each of the actors are separated. In phase 1, an analysis of strategy partners is conducted. The purpose of the collaboration drives the identification of a common product or service bundle.

The phase of the local to-be concept (Phase 2) is subject to a public-private process analysis. It intends to reveal intra-organizational business processes and the inter-enterprise processes for each of the participating actor. The process modeling is conducted by making use of graphical and technical depiction tools as well as technical

readability and exchange means. It serves to identify local contents such as data, forms, and messages. Compared to Phase 2 the subsequent phase is concerned with the global to to-be concept (Phase 3). Actors identify public parts that are relevant to the coordination of the network. By this, actors are able to identify their share in the global concept and integrate public parts into intra-organizational parts. The global to-be concept embraces global contents such as data, forms, and messages. It includes in addition the construction of a public interface that serves as a white box and discloses the global contents and makes them accessible to the actors.

The local implementation takes place in phase 4. It refers to that each actor conducts the implementation of the public processes individually and within the individual organizations. If possible, the procedure model recommends applying pre-configured reference interfaces to transfer process models into their inbound procedural activities. The Phase 5 concerns the execution of the collaboration and serves as a formal milestone that the collaboration formation is passed. In this phase, actors negotiate their interactions by agreeing upon procedural and technical tasks. By this, they determine inter-organizational workflows. They agree upon quality measures to assure the monitoring of the collaboration and the adaptation of the collaboration within the individual organizations. One core quality measure refers to security measures and guidelines that support actors in identifying security issues and addressing appropriate manners to hamper the disclosure of confidential data. Technical tasks describe what is needed to execute the interaction in a technical manner. By this, the public process model becomes automated for intra-organizational use. The BPMLM applies the principle of bilateral negotiations. Thus, it expects that any actor negotiates its procedural and technical interactions with any corresponding actor. Technically, it assumes that actors make use of information technology where appropriate. Once the collaboration execution phase is finished and the collaboration ended, collaboration learnings in form of conducted changes or updates are not reported. However, they may be reused in a new collaboration scenario.

The research approach of the BPMLM is grounded in action research and results from an IS driven research project in which the researchers participated. Interviews with experts in the field of business process management were conducted to gain further insights. Within the project, the project phases covered the analysis, simulation, and optimization of the BPMLM.

The architectural design of the BPMLM includes the following elements:

- Models: organization models, reference and meta data models

- Roles of actors and identities to control access to the network and the repository elements
- Process Data: business process data that concerns network relevant process models considering public-private viewpoints and business structure data that concerns the organizational structural model of the network considering public-private viewpoints
- Collaboration specific case data: it describes the tasks and the network. Further data has been assessed such as secondary data, historical data, and runtime data.

The execution design of the BPMLM includes the following elements:

- Roles of modelers and identities to design the BPMLM and build the BPMLM
- Standards: individual standards are applicable, but the assimilation of individual standards is required. A meta-standard is not supported by the BPMLM.
- Collaboration management and controlling include build-time and run-time phases as well as the management of roles and identities.
- Technical execution concerns public process execution with applicable standards

Given that the architectural approach of the BPMLM is a large concept, it is recommended modularizing future research in particular in the field of the build of a common repository and conducting a proof-of-concept for the modules (cf. Theling, Zwicker, Loos, Adam, & Hofer (2005), p. 89).

The comparison of the BPMLM and the B2GPM is being conducted in a tabular format (Table 7.21). References to the B2GPM indicate the task names and numbers.

Table 7.21: Comparison of the B2GPM and BPMLM

Key characteristics of the BPMLM		⇨ Link of BPMLM to B2GPM	Key characteristics of the B2GPM
Phase 0	Collaboration initiation and preparation	⇨ Part 1	Part 1: Identification and determination of the organizational constructs 1.1 Initiate B2G collaboration 1.2 Determine organizational constructs 1.3 Determine organizational pairs
Phase 1	Collaboration formation	⇨ Part 1	Part 2: Identification and determination of the institutional forces 2.1 Assess institutional forces 2.2 Assess softening factor 2.3 Assess impact of conflicting institutional forces
Phase 2	Local to-be concept	⇨ Part 2 ⇨ Part 3	Part 3: Identification and description of public processes 3.1 Assess interactions (linkages) 3.2 Cluster linkage types 3.3 Determine linkage content
Phase 3	Global to-be concept	⇨ Part 2 ⇨ Part 3 ⇨ Part 4	Part 4: Determination of medium types and applicability of standards 4.1 Determine medium type(s) 4.2 Apply medium type(s)
Phase 4	Local implementation	⇨ Part 4 ⇨ Part 5	Part 5: Establish standard-enabled B2G collaboration 5.1 Establish standard-enabled B2G collaboration
Phase 5	Collaboration execution	⇨ Part 5	
Research approach	Action research based on design-like principles Focus on analysis, simulation, and optimization of the BPMLM	⇨ Research method	Design-driven action research Focus on analysis, design, build, simulation, and testing of the B2GPM
Architectural design	Case study based Elements include models, data sets, roles	⇨ Design principles	Design follows design principles Grounded in regulatory requirements for export and customs management Designed to prove generic applicability

			Provision of a meta-model and flow chart diagrams Structured descriptive and graphical depiction of each of the tasks and corresponding activities Provision of outputs, roles, references to pre-existing resources, activities, and dependencies / connectedness within the model
Execution design	Case study based Elements includes roles, use of standards, collaboration management, and technical execution	⇨ Design principles and references in parts 1 to 5	Grounded in case study and based on related work: inter-organizational collaboration, public processes, IS standards research, and export / customs case studies Provision of roles, pre-existing content, order of activities and description, and dependencies / connectedness within the model
Evaluation check	Grounded evaluation based on the researchers' experience and input of experts Evaluation is case study dependent Evaluation guidelines were not accessible or at least not published	⇨ Evaluation measures	Evaluation measures are provided Grounded evaluation based on the Guidelines of Modeling, the design principles, and input of experts Evaluation is not case study dependent Evaluation guidelines were published and made accessible
External validity	Tested under the conditions of the research project	⇨ Evaluation measures	Based on the input of three distinct networks and external sources the model proves to be externally valid Tested in form of an experiment Tested in selected external case studies in the field of customs

7.10.6 Communication Process of the Results and the Artifact

Evaluation is based on the utility of the artifact to be reused and the research results to be clearly communicated. When the World Bank Group issued a series of case studies in the field of export and customs management, it applied a descriptive mode to describe each of eight cases and to explore possible common denominators among them (cf. The World Bank Group (2004), p. 1-5). The following review of the export and customs management in the case of Ghana will demonstrate if and how the B2GPM is applicable for reuse. The case of Ghana has been chosen because of the maturity of IS driven customs and export management and its novel approach in binding business and governmental actors: “it clearly illustrates how introducing ICT, even in the absence of comprehensive customs reform, can strengthen revenue mobilization and speed up cargo clearance. Ghana has adopted a novel approach to the introduction of ICT by commissioning this task to a joint venture company, the Ghana Community Network. The vision is to connect all members of the trading community in an electronic network so as to facilitate all aspects of the trade transaction for both traders and the government agencies overseeing these transactions, each of which has its own agenda.” (ibid., p. 4).

Thus, the case of Ghana serves as a checkpoint if additional learnings and findings by use of the B2GPM and the institutionalization of standards are encountered and if the B2GPM benefits the collaboration assessment vice versa. Next to Ghana, the World Bank Group investigated the countries Bolivia, Morocco, Mozambique, Peru, Philippines, Turkey, and Uganda. The criteria that the World Bank Group applied to compare the cases are motivation enough to claim appropriateness for this work and are as follows:

“1. The background of the reform and modernization process, including its economic and institutional context, factors leading to reform decisions, supporters, objectives and design, and financial and technical support,

2. The issues pertinent to the reform process,

3. The reform measures themselves, including legislation; management changes; staff-related questions, such as pay, selection, training, integrity, and corruption; information technology; valuation; experience with preshipment inspection; special import regimes; and selectivity in pre- and post-release control,

4. The outcomes, including the effect of reform on fiscal performance, trade facilitation, corruption, staffing and workloads, and conformity with international standards plus, where available, an assessment of quantitative performance indicators and users' reactions,

5. The lessons that each of these reforms contain a judgment about the sustainability of the modernization initiatives." (The World Bank Group (2004), p. 1-2)

The following worksheets are now presented to disclose the result of the assessment of the Ghana case and the utility of the B2GPM in the case study of Ghana. The content of the worksheets will remain within the worksheets for simplification and readability reasons. Each of the worksheets refers to a task as presented in the Sections 7.3 to 7.7. The worksheets (Figures 7.22 to 7.33) apply the template as presented in Section 7.2. Key observations at the end of the presentation conclude the assessment.

<table>
<tr><td colspan="3">Task: 1.1 Initiate B2G collaboration</td></tr>
<tr><td>Output:
Kick-off of B2G collaboration</td><td>Roles:
Business actors of trader community that initiate collaboration: manufacturers and customers</td><td>Resources:
Business development
Supply relevant processes
Sales orders</td></tr>
<tr><td colspan="3">Description:
The task triggers the formation and establishment of B2G collaboration and represents the formal kick-off.</td></tr>
<tr><td colspan="3">Activities:
Initiate collaboration through
Conduct business development
Supply relevant processes (refilling storages and distribution centers)
Fulfill sales orders
The initiation of the B2G collaboration in the case of Ghana reflect the import of goods to Ghana. The initiation is triggered by the receipt of import forms. If specific activities prior to that receipt are collaboration-sensitive or not, is not described.</td></tr>
<tr><td colspan="3">Dependent tasks: 1.2</td></tr>
</table>

Figure 7.25: Worksheet Task 1.1

Task: 1.2 Determine organizational constructs in organizational field		
Output: Collaboration chart that lists organizations and organizational populations involved and position in the collaboration schema List of unassigned organizational constructs Determine role of organizational constructs Complete documentation	Roles: Business and governmental engineers that engage in trade and customs relevant activities	Resources: Identification of organizational constructs Apply pre-existing knowledge from Figures 6.21 and 6.22 Network actor analysis techniques adopted from Brass (1995)
Description: The task seeks to identify organizational constructs and the position of each of the constructs in the overall collaboration chart. An organizational chart exists. The identification is a pre-requisite for any further activity.		
Activities: Determine domain the actors belong to: business, governmental, and inter-governmental Determine the organizational construct the actors fit to: - BOs and BOPs embrace declarants (BOP2), shippers (BOP7, BOP8), traders, banks, and African ground operations, as well as importers. - GOs embrace Ministry of Trade and Industry being responsible for customs, excise and preventive services (GO2). - GOPs embrace port and harbor authorities (GOP6), freight stations, and destination inspection service agencies (GOP5). Update collaboration chart from Figure 44 and identify B2G relevant collaboration activities (Figure 6.13, Table 6.1): the collaboration chart is updated with BOPs for banks and ground operations, and GOPs for freight stations. Assign actors to identified organizational constructs: see asssignment ubove Determine missing organizational constructs, aggregation levels, or conditions that prevent from deciding upon position of organizational construct Decide upon relevance as well as inclusion or exclusion of missing organizational constructs The update is the following: - Importers are not part yet of the organizational constructs. Therefore they become added as BO13 and BOP13. - The unclear use of traders has been resolved in the B2GPM as follows: a trader is any of BO2, BO3, BO4, BO5, BO6, BO7, BO8, and BO9. Aggregation levels BOP1 to BOP9 refer to traders and trader communities accordingly if references point to more than one trader or trader community. Thus, this needs to be clarified for further use. Banks are new constructs so do ground operations. - Concerning further activities of the Ministry of Trade and Industry this construct is new. - Freight stations are new constructs (BOP13). - Banks are new constructs (BOP12). - The International Federation of Inspection Agency is a new construct (IGO4). - The local shippers council has some influential role but does not interfer the B2G collaboration. t is therefore not added to the organizational constructs. The assessment leaves the role of the exporter open. Further clarification is required.		
Dependent tasks: 1.3		

Figure 7.26: Worksheet Task 1.2

<table>
<tr><td colspan="3">Task: 1.3 Determine organizational pairs</td></tr>
<tr><td>Output:
Position of organizational constructs in the collaboration schema
Definition of collaborating pairs
Add to documentation</td><td>Roles:
Business and governmental engineers that engage in trade and customs relevant activities</td><td>Resources:
Identification of position of actors in collaboration chart
Apply pre-existing knowledge from Figure 6.12 and 6.13, as well as Table 6.1
Network actor analysis techniques adopted from Brass (1995)</td></tr>
<tr><td colspan="3">Description:
This task embraces the identification and verification of collaborating pairs for each of the organizational constructs involved and from the position of these actors that seek support in B2G collaboration formation.</td></tr>
<tr><td colspan="3">Activities:
Identify pairs of organizational constructs that collaborate:
- BOP2 <-> GOP5
- BOP2 -> BOP12
- BOP12 -> GOP5
- BOP12 -> GO2
- GOP5 <-> IGO4
Compare pairs with pre-existing list and extend if needed:
- A complete assessement of organizational pairs was not possible based on the limited description provided.
Determine direction of actors that are involved: ‘from’ (sender) or ‘to’ (receiver)</td></tr>
<tr><td colspan="3">Dependent tasks: 2.1, 2.2, and 2.3, 5.1</td></tr>
<tr><td colspan="3"></td></tr>
</table>

Figure 7.27: Worksheet Task 1.3

Task: 2.1 Assess institutional forces		
Output: List of directly involved, passed legislation with relevance to present B2G collaboration scenario List of relevant inter-governmental sources	Roles: Business and governmental experts or advisors Trade and customs advisors ideally from local, national customs administration and trade associations (i.e. IRU (IRU (2009)), EVO (EVO (2005)))	Resources: Pre-existing list of regulatory and supplementing sources Identification of additional sources seeking advice from regulatory advisors
Description: This task triggers collaboration from a theoretical perspective, existing regulation and conventions. Unless actors initiate B2G collaboration through their sets of tasks (1.1 and 1.2), institutional forces remain un-applied. Ghana conducted during the 1990's till 1998 trade and customs reforms. This task focuses on comparison of pre-existing regulatory sources for trade and requires multiple perspectives: national, supranational, and inter-governmental sources. In the case of Ghana national reforms were undertaken. Supranational sources of influence are not documented. Inter-governmental sources were not mentioned.		
Activities: Compare national legislation requirements with pre-existing list: national legislation requirements of Ghana need to be added to the list. Include relevant national regulatory sources and regulatory changes: in case of import, the economic value that drives the formal process changed through the reform. Decide upon relevance of supranational forces as in case that one of the organizational constructs reside within European Union: this is not relevant in the current investigation. Compare supranational legislation requirements with pre-existing list: this is not relevant in the current investigation. Include relevant supranational regulatory sources and regulatory changes: this is not relevant in the current investigation Assess inter-governmental sources and their relevance for the present collaboration scenario: - The International Federation of Inspection Agencies certifies GOP5 and is therefore taken into account. - This leads to an additional pair of constructs (GOP5) with an inter-governmental agency that was not included yet in the list of organizational constructs. This pings back to Tasks 1.2 and 1.3. IGO4 got added as well as the pair of GOP5-IGO4. Include relevant inter-governmental sources and updates: information in the presented documentation is missing and needs to be checked. Prioritize institutional sources based on the order of national, supranational, and inter-governmental sources: so far the inspection certification and the scanning requirements for the import from the US are to be included in the collaboration design. Gather documentation of institutional forces and create list: this needs to be done.		
Dependent tasks: 2.2		

Figure 7.28: Worksheet Task 2.1

Task: 2.2 Assess softening factor		
Output: List with 100% transposed and partly transposed conventions and supranational legislation Documentation of procedural activities that result from partly transposed conventions and regulations. Identification of conflicting intergovernmental and supranational forces	Roles: Business and governmental experts or advisors Trade and customs advisors	Techniques: Pre-existing list of regulatory and supplementing sources Identification of transposition levels and seeking advice from regulatory advisors Conduct interviews if necessary Review supplementing material
Description: At this point of the procedural model, regulatory requirements that are subject to form B2G collaboration are influenced by partly transposed requirements. As previously assessed, those influence rather business actors and extend procedural efforts they have to conduct to be compliant with regulatory requirements of the receiving end.		
Activities: Determine transposition degree of supranational legislation and inter-governmental conventions from the perspective of the individual organizational construct Document procedural and regulatory differences in partly transposed conventions and supranational legislation from an organizational construct and collaboration perspective and assess procedural, legal, and economic effects for collaborating pairs		
Dependent tasks: 2.3		

Figure 7.29: Worksheet Task 2.2

Task: 2.3 Assess impact of conflicting institutional forces		
Output: List with identified conflicting national legislation Documentation of procedural activities that result from conflicting forces	Roles: Business and governmental experts or advisors Trade and customs advisors	Techniques: Pre-existing list of regulatory and supplementing sources Conduct interviews if necessary Review supplementing material Get legal advice
Description: This task serves, similar to task 2.2, an assessment of regulatory conflicts that affect B2G collaboration. Conducting this task requires additional input and advice from trade and customs experts. The interpretation of regulatory differences needs legal expertise. Activities: Compare national and foreign legislation based on procedural activities and organizational pairs that are in scope for B2G collaboration Review planned regulatory changes and modifications Document procedural differences and assess procedural, legal, and economic effects for collaborating pairs		
Dependent tasks: 3.1		

Figure 7.30: Worksheet Task 2.3

<table>
<tr><td colspan="3">Task: 3.1 Assess interactions (linkages)</td></tr>
<tr><td>Output:
List of relevant interactions in a pre-formatted format</td><td>Roles:
Business and governmental engineers that have experience in inter-organizational process assessment</td><td>Resources:
Inter-organizational business process analysis
Public process analysis
Determine interactions relevant for B2G from pre-existing list of interactions
Textual, descriptive analysis</td></tr>
<tr><td colspan="3">Description:
This task focuses on the determination of relevant interactions between identified collaborating pairs. The task uses the documentary material from tasks 2.1 to 2.3 to assess updated and newly introduced regulations.</td></tr>
<tr><td colspan="3">Activities:
Compare interactions from pre-existing list with newly identified procedural activities from tasks 2.1 to 2.3: in the case of Ghana nine interactions were identified. They map to the existing linkage types as follows. The details are added to the nested table:
<table>
<tr><th>Linkage types 1-7</th><th>Linkage types 8-14</th><th>Linkage types 15-21</th></tr>
<tr><td>1 Accredit: inspection agencies</td><td>8 Ease</td><td>15 Mandate</td></tr>
<tr><td>2 Allow</td><td>9 Exchange: import declaration form, invoice, and bill of lading</td><td>16 Prove</td></tr>
<tr><td>3 Check: shipment</td><td>10 Facilitate</td><td>17 Provide: import declaration report</td></tr>
<tr><td>4 Comply with</td><td>11 Get access to</td><td>18 Release: shipment</td></tr>
<tr><td>5 Conduct: payment verification</td><td>12 Give access</td><td>19 Require: consignment</td></tr>
<tr><td>6 Cooperate in</td><td>13 Issue: waybill</td><td>20 Submit: import declaration form</td></tr>
<tr><td>7 Dispense with</td><td>14 Manage</td><td>21 Verify: customs declaration form</td></tr>
</table>
Assess newly identified interactions: so far no new interactions were identified
Distinguish private and public process parts: among the pre-existing linkage types eight interaction types are applied in the present investigation; these interactions apply to be public
Identify commonly shared tasks, aggregate, and eliminate duplicates: duplicates have not been encountered.
Describe remaining interactions following format of pre-existing list
Extend existing list of interactions and conclude documentation
Determine roles to identify and maintain public processes
Determine accessibility and management of interactions</td></tr>
<tr><td colspan="3">Dependent tasks: 3.2</td></tr>
</table>

Figure 7.31: Worksheet Task 3.1

<table>
<tr><td colspan="3">Task: 3.2 Cluster linkage types</td></tr>
<tr><td>Output:
List of relevant interaction types in a pre-formatted format</td><td>Roles:
Business and governmental engineers that have experience in inter-organizational process assessment</td><td>Resources:
Inter-organizational business process analysis
Public process analysis
Apply pre-existing list of interaction types and cluster interactions if necessary
Textual, descriptive analysis</td></tr>
<tr><td colspan="3">Description:
This task focuses on the clustering of interaction types and eases the identification of the scope of collaboration. The task applies documentary material from task 3.1 unless institutional forces remain the same as those provided as pre-existing material.</td></tr>
<tr><td colspan="3">Activities:
Concerning the update or cluster of linkage types, no activity is required as interaction types are pre-existing.
Determine roles to identify and maintain public processes: concerning the identified organizational pairs they account for some of the eight identified linkage types. Others need to be checked based on a more detailed documentation.
Determine accessibility and management of interactions: The management of customs data is subject to GO2. The management of ‘other data’ as referred to in the original text revealed the local standards board that seem to play a significant role in the collaboration design. Therefore an update of the organizational constructs and subsequent tasks is necessary.</td></tr>
<tr><td colspan="3">Dependent tasks: 3.3, 4.1, 1.3</td></tr>
</table>

Figure 7.32: Worksheet Task 3.2

<table>
<tr><td colspan="3">Task: 3.3 Determine linkage content</td></tr>
<tr><td>Output:
List of interaction content that transmits to organizational constructs via linkages
Content documentation</td><td>Roles:
Business and governmental engineers that have experience in inter-organizational process assessment</td><td>Resources:
Inter-organizational business process analysis
Public process analysis
Apply pre-existing list of content and extend if necessary
Textual, descriptive analysis</td></tr>
<tr><td colspan="3">Description:
Unlike the format of public processes, the separation of linkage types and linkage content isolates the content part from the technical, connecting part. This task eases the identification of pre-existing content parts in regulatory sources and the identification of issuing governmental institutions.</td></tr>
<tr><td colspan="3">Activities:
Assess content:
- The content of collaboration is based on the pre-existing content list: in the case of Ghana content types were identified. They map to the existing types as follows. The details are added to the nested table:
<table>
<tr><td>Pre-formatted content</td></tr>
<tr><td>1 Regulatory framework: national regulatory framework</td></tr>
<tr><td>2 Governance framework: the framework covers import measures to govern the entry of goods to Ghana</td></tr>
<tr><td>3 Security framework: a dedicated framework of security measures has not been identified; however a mix of physical and virtual checks is being conducted to meet security measures.</td></tr>
<tr><td>4 Risk management framework: as documented in the original reference of the assessment, a risk analysis framework is not set in place yet (cf. The World Bank Group (2004), p. 31).</td></tr>
<tr><td>5 Organizational status entitlement and processing: in the present case, this refers to the certification process of inspection agencies.</td></tr>
<tr><td>6 Trade relevant procedures for export, import, and transit: import procedures have been updated and applied under the new conditions.</td></tr>
</table>
Determine roles to identify and maintain content:
- Each of the pre-formatted contents is being applied.
- However, the assumption of having a proper framework, thus structured description of tasks, activities, and assignment of roles and constructs, internalized is partly true. This task requires further and more detailed elaboration.
Determine accessibility and standardization content:
- The original source of reference refers to the local standards board. However, details are not made accessible. This requires further insights.
- Concerning the partly available content types, further criteria to access those and decide upon the standardization potential are dependent on the availability of the described contents.</td></tr>
<tr><td colspan="3">Dependent tasks: 4.1</td></tr>
</table>

Figure 7.33: Worksheet Task 3.3

<table>
<tr><td colspan="3">Task: 4.1 Determine medium type(s)</td></tr>
<tr><td>Output:
Assessment of standardization potential of linkage types and content
Cluster of physical, paper-based, and IT-enabled</td><td>Roles:
Process modeling engineers
Standardization engineers
Trade and customs engineers</td><td>Resources:
Textual, descriptive analysis
Alignment of business standards framework characteristics</td></tr>
<tr><td colspan="3">Description:
This task is the central task for enabling standardized B2G collaboration. It assesses role and potential of business standards in B2G. It focuses on the definition of medium types resulting from previously conducted tasks 3.1 to 3.3 and the provision of a standards framework that facilitates the identification of standardizable content.</td></tr>
<tr><td colspan="3">Activities:
Assess medium types that are named, proposed, and provided. The following nested table refers to the applied medium types in the present case:
<table>
<tr><th>Medium type</th><th>Format of medium type</th><th>Case of Ghana</th></tr>
<tr><td>Paper-based</td><td>Descriptive (text)</td><td>Regulations, procedures, and processes: no reference or details are made accessible.</td></tr>
<tr><td>Paper-based
Electronic</td><td>Standardized, not specified</td><td>Procedures and processes, data formats:
The import process has been standardized in a way that eight individual steps are being described.
Concerning data formats details are not provided in the source of the reference.
Forms as for example the declaration form, invoice, inspection certificate, and the certificate of origin are standardized in a paper-based format.
The consignment, shipper’s manifest, and the payments are being processed electronically.</td></tr>
<tr><td>Electronic</td><td>Standardized, specified</td><td>WCO Data Model, forms relevant for Certificate of Health, Certificate of Origin, or C-TPAT: no reference has been made.</td></tr>
</table>
Assess conditions for standardizing content and determine criteria that form standards framework
Evaluate existing standards that fulfill criteria
Define conditions of business standards usage
Decide upon standards framework that fulfills criteria
Provide linkage content and linkage types in modeled, pre-described manner</td></tr>
<tr><td colspan="3">Dependent tasks: 4.2</td></tr>
</table>

Figure 7.34: Worksheet Task 4.1

Task: 4.2 Apply medium type(s)		
Output: Standardized content and business standard framework Alignment, maintenance, and deployment concepts for standards provision in the organizational field	Roles: Process modeling engineers Standardization engineers Trade and customs engineers	Resources: Standardization activities for distinct types UN/CEFACT open development process UN/CEFACT Modeling Methodology (UMM) for public process modeling UN/CEFACT Core Component Technical Specifications (CCTS) for data and message standardization Document engineering with focus on private process engineering UML diagrams for the modeling Provision of assimilation tools to assess vertical requirements in cross-sectoral collaboration with industry-specific aspects
Description: Based on the available documentation and due to the lack of disclosed information on data elements and forms this task needs to be completed upon further details (cf. The World Bank Group (2004), p. 30-31). This task follows task 4.1 and focuses on the development and deployment of standards. It covers the provision of standards. This task promotes the usage of a worldwide applicable business standard that fulfills criteria as outlined in task 4.1. The criteria to follow are those of Figure 7.10.		
Activities: Provision of standardized elements (processes, data, and forms) Apply standardization to pre-existing elements Determine accessibility and maintenance of standards framework Define integration potential and needs with legislation modeling Define necessity of remaining paper-based and physical activities Align standardization activities within the standard development process		
Dependent tasks: 5.1, 3.3		

Figure 7.35: Worksheet Task 4.2

Task: 5.1 Establish standard-enabled B2G collaboration		
Output: Internalization of standardization method and content into B2G collaboration	Roles: Process modeling engineers Standardization engineers Trade and customs engineers	Resources: Open standard development process activities that refer to publication, deployment, and maintenance of business standards Document engineering with focus on private process engineering UN/CEFACT Modeling Methodology (UMM) for public process modeling UN/CEFACT Core Component Technical Specifications (CCTS) for data and message standardization
Description: This task focuses on the institutionalization of the collaboration. It needs to take into account that access to B2G collaboration is determined through regulatory compliance and therefore unlimited. Coordination needs arise from activities that embrace regulation updates, pre-formatting of legislation and public process models, as well as publishing these. Further actor roles need to be assessed to conduct maintenance and conformity needs. An alignment with conformity assessment activities as conducted by the US Chamber of Commerce for example is highly recommended.		
Activities: Institutionalization of collaboration: based upon the trigger of import activities to Ghana, the collaboration is ongoing. The access to the collaboration is polycentric thus exporters and importers are not being controlled. Ensure unlimited access to collaboration: it is unlimited. Determine coordination needs: the missing details in the previous tasks require further analysis to assess coordination needs. Define additional actor roles required: the role of the standards board and the customs personnel requires further investigation. This relates to an observation made in the case study concerning the skill development, training, and task assignment of customs and import personnel (cf. The World Bank Group (2004), p. 31). Internalize standards and public processes: this is part of the strategy of the Ministry of Trade and Industry (ibid.) Execute collaboration: done		
Dependent tasks: 1.2, 1.3, 2.1, 2.2, 2.3		

Figure 7.36: Worksheet Task 5.1

The reuse of the B2G Procedure Model as conducted in above documented activities concludes with the following observations. The reuse served the author of this dissertation to reassess the correctness of the order, the level of detail, and the presented pre-existing knowledge. The order of the tasks and activities as presented was not questioned during the use of the model in the external case study. It revealed yet undiscovered details in the case study of Ghana that requires further investigation. The

case study described in a high-level format the import procedure and the B2G collaboration. Hence, the B2GPM serves to outline further activities and provides helpful support to governmental and business actors involved in the presented collaboration scenario. The level of details that is applied in the B2GPM is of more detailed and properly structured compared to the descriptive text of the selected case study. Thus, the B2GPM is applicable as a checklist to assess missing details. It should be noted that the use of the B2GPM is appropriate for the analysis and design of repeatable collaboration scenarios. Otherwise, the effort in comparing and structuring content is time intensive and does not serve a scenario that is based on one import transaction.

The order of tasks and activities in the B2GPM helped to reveal undisclosed or not yet retrieved procedural or technical details. Once added, it refines by further use and serves as a procedural and technical repository for both governmental and business actors. At this stage, the worksheets were helpful to guide through the activities and to document the scenario related details directly.

It is most likely that in the case if more than one person applies the B2GPM, it will be useful to work with the flow charts and distribute them to individual persons based on the identified roles in the worksheets. By this, distinct perspectives will be accessible in a shorter period and help to embrace more collaboration needs than most probably have been identified herein. The latter comments are execution related ideas that arised by the reuse of the model. Further use of the model will add to them and test the practicability of the model.

7.10.7 Evaluation Summary

This section concludes the above-outlined conducted evaluation cycles. The evaluation of the B2G Procedure Model (B2GPM) resulted in the following:

- The design and build of the B2GPM procedure model is based on the claimed collaboration need and the derived design principles.
- The design and build of the B2GPM follows the Guidelines of Modeling.
- The B2GPM is applicable in another case that is not related to the reference framework. The reuse to the external case study of Ghana is an indicator for its utility.

- The design and build of B2GPM applies methodologies that have been applied in existing procedure models.
- The B2GPM and the methodologies used to design and build it contribute considerably to the relevant research disciplines.
- The B2GPM is useful for other cases of export-driven collaborations.

The above-conducted evaluation cycles did not only concentrate on B2G collaborations in the context of collaboration design for organizations that are involved in the export of goods, but also in a case study concerning the import to Ghana. However, the focus on export in this work led to the selection of the reference framework and three industry-focused networks. Still, this research is not only based on the observation of collaboration in the reference framework, but on the application of the B2G Procedure Model (B2GPM) in collaborations that are not connected to the reference framework. The core contribution of this work, the B2GPM, was being developed during the observation phase.

The intention of this work was the build of the B2GPM. No formal deployment of the artifact was intended to become included in this work. There are no existing artifacts that address the same problem. Existing methodologies as the approach of the BPMLM and the Guidelines of Modeling allow comparing the design methodology of the B2GPM with them. Based on the comprehensiveness of the previously conducted evaluation cycles, the results demonstrated the generic applicability of the B2GPM. However, the identification of deficiencies in the artifact requires the use of the B2GPM in further studies. As additional research will build on the B2GPM, the reuse of the B2GPM in further contexts and future research is crucial to the practical applicability of the model. The chosen format to present the B2GPM and the procedural and organizational details facilitate the collaboration of researchers. Furthermore, it provides a format that allows IT architects from business, governmental, and non-governmental units to utilize the artifact and explore new ways to sustainable collaboration.

8 Reflections on Organizational Adoption

8.1 Introduction

Having proved the applicability of the B2G Procedure Model in the previously conducted evaluation cycles, the question about decisions to adopt the Model needs to be elaborated further. The model is seen as a procedural innovation by which B2G collaboration in customs management can be further improved. Innovation is defined in generals as something new (Tidd et al. (2005)). A far more precise definition is provided by the Organization for Economic Co-operation and Development (OECD) (2005) concluding that a technological new product that includes a significant improvement and has been put into use is perceived as a technological innovation. Furthermore, the technological innovation considers scientific, technical, organizational, financial and commercial aspects (OECD (2005)). The capability of the B2G Procedure Model to affect inter-organizational collaboration depends on the adoption potential of the Model from an organization's point of view. This leads to the question about the influencing factors of organizational adoption. Hereby, a framework is required to investigate the question further (cf. Dedrick & West (2003)). The framework is provided by this dissertation based on the following approach. The reference framework as introduced in this dissertation captures the core elements of customs-relevant B2G collaboration. Three instances of the reference framework were illustrated and described in a qualitative case study. Considering the essential elements of organizational adoption, this chapter investigates possible factors of influence on adopting the B2G Procedure Model. The remainder of the chapter is structured as follows. A theoretical outline of key aspects of organizational adoption will be conducted. Resulting from the study of the three instances of the reference framework, possible factors of influence are elaborated and structured. Based on the study results and supplemented with related work, barriers and drivers of adoption are then introduced. The introduction of barriers and drivers concludes the chapter.

8.2 Theoretical Outline of Organizational Adoption

It is important to investigate the influencing factors an innovation is confronted with. The innovation in this case, the B2G Procedure Model, aims to make an impact on organizational and inter-organizational levels. The B2G Procedure Model is innovative based on the fact that it includes a significant improvement of inter-organizational

collaboration activities and has been actually tested. The Model consists of a variety of scientific, technical, and organizational aspects (cf. OECD (2005)). If an organization lacks the capability to participate in a customs-related B2G collaboration, it fails to participate in global trade for that collaboration. Literature provides a number of theoretical outlines and studies on the process of organizational adoption for innovations and adoption specific factors that affect the process (cf. Baskerville & Pries-Heje (2001); Brown & Cox (1971); Cooper & Zmud (1990); Gold (1981); Keller (2004); Mustonen-Ollila & Lyytinen (2003); Soete & Turner (1984); Swanson (1994)). The role of governmental organizations is covered in the following adoption related studies (cf. Burn & Robins (2003); Kumar, Maheshwari, & Kumar (2002); Lee, Tan, & Trimi (2005); Sagheb-Theran (2007); Wonglimpiyarat & Yuberk (2005)).

The numerous existence of related work as outlined above required a study of relevant impacting factors of adoption (cf. Frambach (1993); Woodside & Biemans (2005)). Studies conducted by Frambach (1993) and Woodside and Biemans (2005) concluded that firstly research could focus on speed, patterns, and extent of adoption of a specific innovation and secondly suitable factors that are specific to organizational adoption. Thirdly, subsequent research may be applied to examine determining factors of innovation (ibid.). It is presumed in this dissertation that the adoption of B2G relevant collaboration patterns is relevant to adopters and once successfully achieved legitimates the innovation (cf. Rogers (2003), p. 403). The interest is provable by the presented legislative sources that stressed the need of an IS-driven customs management (see **Table 6.4**). Besides the innovation design, the legitimacy of an innovation is concerning organizations and not individual users (cf. Fichman (1992)). The adoption process concerning both aspects, legitimacy and organizational adopters, includes fives stages (cf. Rogers (2003), p. 420-432): agenda setting, matching, restructuring, clarifying and routinizing. Assuming the initiation of the innovation has been conducted, the stage of agenda setting is finished. The stage of matching the innovation to an organizational need is the adequate starting point of adoption-triggered research. Herein, Rogers proposes a set of characteristics that assess the potential fit of adoption in organizations: relative advantage, compatibility, complexity, testability or trialability, and visibility of the innovation. Roger's Diffusion of Innovation Theory gained wide acceptance (cf. Prescott & Conger (1995)). Critic was raised concerning the lack of complexity and network-related IS innovations in Roger's proposition (cf. Lyytinen & Damsgaard (2001)). Bearing in mind the collaboration-relevant aspect of organizational adoption, a proposition has been made by various researchers to assess the factors that influence the technological innovation (T) in an adopting organization (O) and the environment of technology and organization (E) (cf. Dedrick & West (2003); DePietro, Wiarda, &

Fleischer (1990)). In technology, the model subsumes the five innovation attributes that Rogers argues influence the likelihood of adoption. On the organizational level, adoption propensity is influenced by formal and informal intra-organizational mechanisms for communication and control. In the environmental dimension, organizational adoption of new technologies depends on having the prerequisite skills for effective deployment.

Referenced to as TOE framework, the TOE as applied in a number of adoption-relevant studies (cf. Dedrick & West (2003); DePietro, Wiarda, & Fleischer (1990); Thomas, Probets, Dawson, & King (2008)). IS researchers (cf. Byrne & Golder (2002); Egyedi & Loeffen (2002); Goossenaerts, Dreverman, Smits, & Exel (2006); Mustonen-Ollila & Lyytinen (2003); Nilakanta & Scamell (1990)) concluded their findings on the use of TOE by revealing additional factors that complement Rogers' adoption criteria. The factors are relative advantage, compatibility, complexity, standards, technological edge, trialability, and observability (cf. Tung & Rieck (2005)). Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes (cf. Rogers (2003)). The degree to which an innovation is perceived as to be consistent with the existing values, past experiences, and present needs of potential adopting organizations (cf. Rogers (2003); Egyedi & Loeffen (2002)). By complexity, related work refers to the degree to which an innovation is perceived as difficult to understand and use (cf. Goossenaerts, Dreverman, Smits, & Exel (2006); Rogers (2003)). Standards are referred to as the vehicle on network effects in further organizations. Compared to these findings, Frambach proposes an assortment of organizational and collaboration-specific elements adopter characteristics, innovation characteristics, and network characteristics (cf. Frambach (1993)). Frambach's proposition raises the attention to the inter-organizational aspects of adoption. This is applied in further studies (cf. Baum & Tolbert (1986); Rivera & Rogers (2004)). Studies as conducted by the World Bank Group (cf. Baum & Tolbert (1986)) group the factors by technical, economic, institutional, financial, environmental, social factors and the degree of consultancy use as well as the process of acquiring / procuring the innovation (ibid.). The approaches of Tung and Rieck, Frambach, and Rogers form the basis for a suitable conceptual model for organizational adoption shown in Figure 8.1.

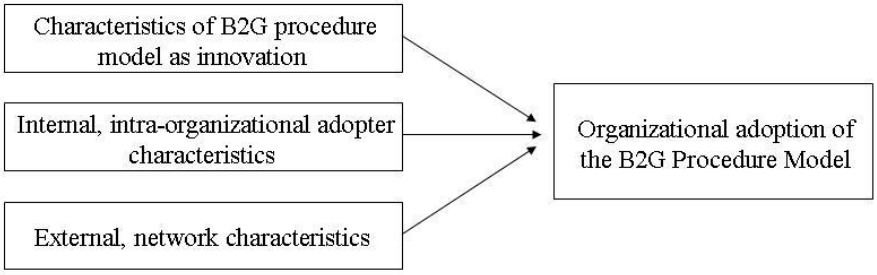


Figure 8.1: Conceptual model for organizational adoption

The factors that are the baseline for the assessment of organizational adoption as shown in Figure 8.1 are now summarized in Table 8.1:

Table 8.1: Characteristics of adoption

Adoption characteristics		Description	Sources
Innovation characteristics			
	Relative advantage	The degree to which an innovation is perceived as better than the idea it supersedes	Rogers (2003)
	Compatibility	The degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters	Egyedi & Loeffen (2002) Rogers (2003)
	Complexity	The degree to which an innovation is perceived as difficult to understand and use	Goossenaerts, Dreverman, Smits, & Exel, (2006) Rogers (2003)
	Standards	Organizations begin to use a standard forcing other organizations to follow	Byrne & Golder (2002) Rogers (2003)
	Technological edge	Superiority to other innovations	Mustonen-Ollila & Lyytinen (2003) Rogers (2003)
	Trialability	The degree to which an innovation may be experimented on a limited basis	Byrne & Golder (2002) Rogers (2003)
	Observability	The degree to which the results of an innovation are visible to others	Nilakanta & Scamell (1990) Rogers (2003)
Adopter characteristics			
	Organizational footprint	Dependencies on organizational size as for example small, medium, and large enterprises, specialization, formalization, and centralization	Frambach (1993)
	Organizational innovativeness	Herein, Frambach refers to the characteristics subsumed under technical innovation characteristics	Frambach (1993)
Network characteristics			
	Interconnectedness	Degree of interaction intensity among actors	Frambach (1993)
	Participation in informal networks	Participation of members of an organization in informal networks	Frambach (1993)

Baum and Tolbert (1986) applied the outlined characteristics to developing countries. Their assessment resulted in characteristics of adoption in which governmental actors are involved. They encounter environmental protection, the procurement process, as

well as social, economic and institutional factors as relevant. Besides organizational adoption, adoption can be assessed by the impact the innovation has on the individual (ibid., p. 213-214). Once adoption is concluded, the authors recommend conducting a financial analysis (ibid., p. 212-213). Financial factors imply economic efficiency, return of investment, and revenue generation resulting from the adopted innovation. Environmental management is regarded as a prerequisite to sustain economic growth and innovation adoption (ibid., p. 217). Resulting from the reflection on these characteristics, governmental adoption concerns the following adoption characteristics (see Table 8.2).

Table 8.2: Characteristics of governmental adoption

Source: cf. Baum & Tolbert (1986), p. 211-218

Governmental adoption characteristics		Description	Sources
Adopter characteristics			
	Procurement process	Dependencies on the duration of acquiring goods and works under the condition framework of strengthening the local economy while ensuring efficiency and meeting procurement regulations; another dependency refers to the inclusion or exclusion of external consultancy services	p. 217-218
	Impact of innovation on people	Impact of an innovation on people; herein, change reluctance or acceptance, sociocultural and demographic characteristics influence the acceptance or the rejection of the innovation	p. 213-214
Network characteristics			
	Economic outcome	The prospected and most appropriate return to the economy is driving governmental adoption. It is recommended to implement preliminary measures such as cost-benefit analysis or internal rate of return.	p. 211-212
	Degree of institutional development	Dependency on the policy environment of an organization and dependency on the degree of institutional development in the observed country, region, or network.	p. 215-216

To sum up, a synthesis of both assessment results concerning adopter characteristics (see **Table 8.1** and **Table 8.2**) is useful to investigate organizational adoption in B2G collaborations. The inclusion or exclusion of network characteristics has been elaborated in Chapter 4.4 under the aspect of their relevance to an organization's role in a B2G network. The result of the aggregation exercise resulted in organizational adoption characteristics and is outlined in Table 8.3.

Table 8.3: Characteristics of organizational adoption in B2G

Adoption Characteristics in B2G		Description
(A) Adopter characteristics		
	(A1) Organizational footprint	Dependencies on organizational size as for example small, medium, and large enterprises, specialization, formalization, and centralization
	(A2) Organizational innovativeness	According to innovation characteristics, thus relative advantage, compatibility, complexity, standards, technological edge, trialability, and observability
	(A3) Impact of innovation on people	Impact of an innovation on people; herein, change reluctance or acceptance, sociocultural and demographic characteristics influence the acceptance or the rejection of the innovation
	(A4) Procurement process	Dependencies on the duration of acquiring goods and works under the condition framework of strengthening the local economy while ensuring efficiency and meeting procurement regulations; another dependency refers to the inclusion or exclusion of external consultancy services
(N) Network characteristics		
	(N1) Degree of institutional development	Dependency on the policy environment of an organization and dependency on the degree of institutional development in the observed country, region, or network.
	(N2) Economic outcome	Degree of prospected and most appropriate return to the economy is driving governmental adoption It is recommended to implement preliminary measures such as cost-benefit analysis or internal rate of return.
	(N3) Interconnectedness	Levels of interaction among actors
	(N4) Participation in informal networks	Participation of members of an organization in informal networks

The interrelatedness of these characteristics from Table 8.3 is shown in Figure 8.2.

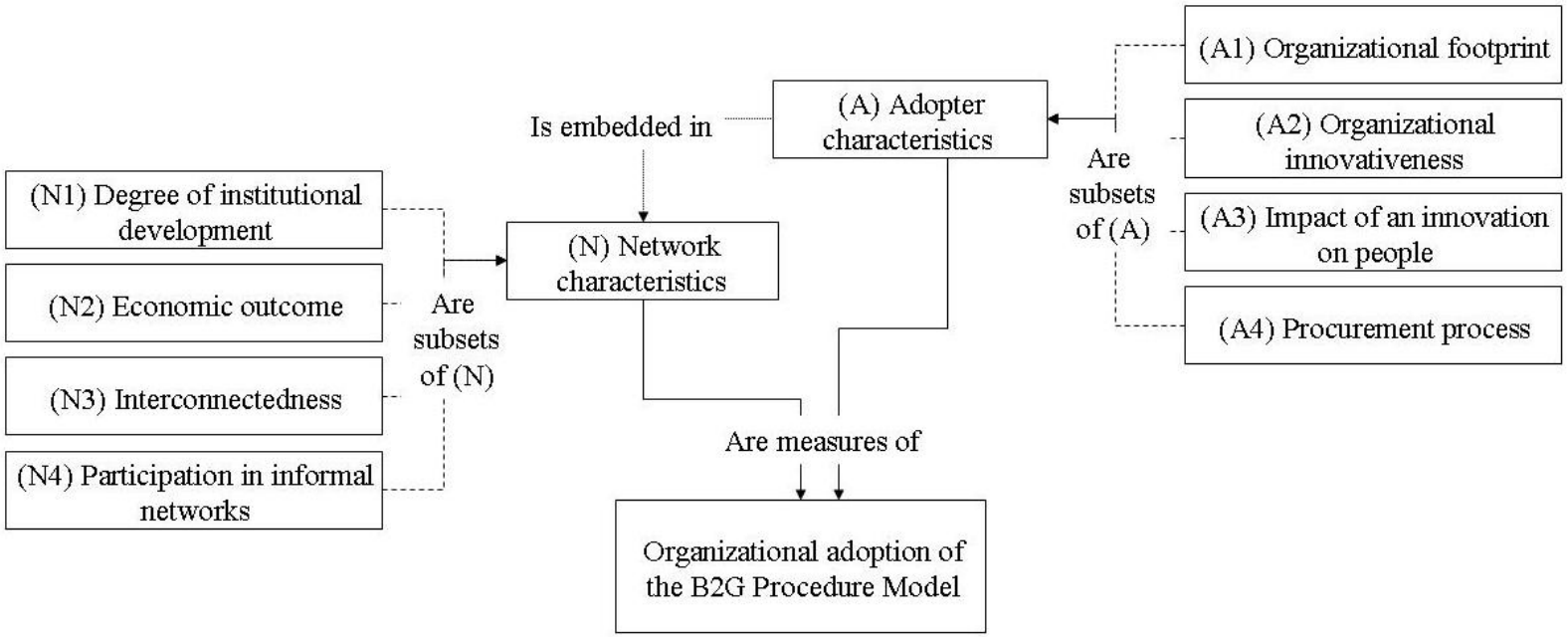


Figure 8.2: Interrelatedness of adopter and network characteristics

Source: cf. Baum & Tolbert (1986), p. 211-218

8.3 Reflection on the Cases

The study of organizational adoption characteristics in the three cases is subject to this section. The section is organized as follows. Firstly, it introduces the cases based on their fit into the reference framework. Secondly, the section reflects on adoption-centric aspects following the above-introduced categories (see Table 8.2) and summarizes the adoption characteristics accordingly.

8.3.1 Introducing the Cases and their Alignment to the Reference Framework

The motivation of including the three cases in the research resulted from the research objective to propose a B2G Procedure Model that facilitates customs management among business and governmental actors. Given this objective, the analysis of the adoption potential is a compelling need. The selection of the three cases was based on the comparability and differentiation of the cases. Firstly, the cases concern the export from small countries, the Netherlands, Denmark, and Finland. The countries are small thus flat in the governmental structure and better observable than complex, multi-layered governmental structures. Entailed by the selection of exporting countries, the corresponding networks share a minimum of six organizational constructs and rely on national, foreign, and EU specific institutional forces. An overview of the three cases is provided in Table 8.4.

Table 8.4: Observed networks

Observed networks	(a) Trade network Denmark-Russia	(b) Trade network NL-UK-USA	(c) Trade network Finland-Russia
Observed product	Dairy products	Beverages	Paper and mill products
Manufacturer	x	x	x
Farmers	x		
External lab	x		
National Government	x		
EU Government	x		
Declarant	x	x	x
Consignor	x	x	x
National customs and tax	x	x	x
National statistics	x	x	x
Non-EU customs and tax authorities	x	x	x
Foreign embassy	x		
Chamber of commerce	x		
Health authorities	x		
Veterinary Specialist	x		
Service providers	x	x	x
Logistics service provider	x	x	x
Consignee	x	x	x
Linkages	Linkages are the process steps as outlined in the reference process		
Institutional forces	They are comprised of national, supranational and foreign legislation		

The inherited import countries, Russia and the United States, are diverse from an institutional perspective. The communistic system is characterized by a sustained period of controlled and substantial governmental bureaucracy (cf. Kornai (1992)) before transition took place with the fall of the Iron Curtain in 1989 (cf. The World Bank (1996)). In contrast to Russia, the United States are recognized as the “leading Western economic power with a capitalistic ideology” (cf. Ralston, Holt, Terpstra, & Kai-Cheng (1997), p. 8). Even if importing countries differ as in the examples of export to USA and Russia, you find common customs process steps. These process steps are summarized in the customs reference process (see **Figure 3.8**). The reference process synthesizes core functions that have been analyzed in the observed export scenarios and outlines the relevant process steps. The perceived contrast of a Russian bureaucratic-based to a US American capitalistic-based customs management did not arise along the study that rich in contrast. Concerning additional efforts in customs management, efforts were documented in certificate handling and security-relevant control procedures

(see **Table 3.7** and **Table 3.11**). The observations conclude in the following. Over-control is apparent in the USA due to the C-TPAT certificate and 100% scanning that is mandated by US American law by 2012. In order to become C-TPAT certified, the exporting and importing actors need to comply with procedural prerequisites and to publish data to the US American customs office. Data includes organizational and financial data as well as details of the bills of material and their countries of origin. Moreover, the USA as importing country requires importers to conduct 100% scanning of goods and transportation means. It needs to be noted that 100% scanning requires the foreign authorities, thus customs authorities in the exporting countries, to scan the containers before they were loaded on a vessel (WCO (2008b), p. 12). Thus, the provision of scanning technology and procedural steps in the outlined reference process to map scanning results and export declarations create additional burden to foreign customs authorities and exporters, but not the US American customs authorities. Once the 100% directive is set in place, the described risk analysis in network a) (see **Figure 3.12**) becomes obsolete. The US American customs authorities do not rely on the electronically conducted risk assessment. In the EU, the risk assessment is a key element of the customs activities. It serves the verification of declaration-relevant data and herein the check of the importer. Moreover, the risk assessment is a means to diminish physical container and product checks and to rely on past and electronically accessible data. The participants of the case study questioned in the case study the usefulness of the 100% scanning directive. A formal statement though was not formulated. The WCO Director of Compliance (cf. WCO (2008c), p. 10-11) comments the difference in the US American procedure to the European procedure by emphasizing that "the United States law represents use of NII[6] as the primary means by which to assess cargo risk" (WCO (2008c), p. 10). To European customs authorities as well as other WCO members, 100% is one of other techniques in a risk management program (ibid.). The perceived control-based customs procedure in form of a 100% reliance on scanned cargo could be easily perceived as an over-control. Compared to the US, the 100% scanning directive is not relevant to imports to Russia. Still, if exporters want to assure the correctness of the import and conduct a physical import control in Russia, they need to execute these activities on a voluntary basis and on their own. In case of network a), the exporter confirmed that he hired in the past an external quality assurance company to conduct import checks. Concerning the institution-based requirements for certificates, imports to Russia and relevant to specific products mandate additional

[6] NII stands for Non-Intrusive Inspection and stands for any form of x-ray scanning technology.

certificates as for example the veterinary certificate, the quality certificate, and GOST certificate. Herein, the choice of product to be exported drives further procedural requirements (see **Table 3.9**). The comparison of both importing countries shows that the countries are not that similar in the inclusion of security-imposed measures in the customs processing. However, the comparison shows that the institutional influence does not only result from the political setting but also from institutional forces such as the perceived 100% directive and the individual need to control. In the latter case, the need to control in Russia is handed over to the importer to check the delivery. Further control is optional in case the exporter wants to verify the entry of the delivery to Russia.

Each of the observed networks is framed by institutional forces. These result from the actors that participate in the described collaborations from distinct countries within and outside the European Union. The directives set in place by the EU legislation trigger the export event and the regulatory requirements for customs management (see **Figure 3.4**). Foreign institutional forces depend on the import destination. Based on the international notion of trade obviously, institutional forces expand by involving foreign directives and recommendations. If apparent to exporting actors, foreign legislation is being studied beforehand to adjust intra-organizational procedures. From an export perspective, exporters seek to accept procedural support if the outcome of support results in a reduction of error-prone data entry and labor-intensive data verification. Otherwise, exporters are reluctant to verify all necessary regulatory requirements for harmonization purposes. In that sense, the harmonization of procedural activities requires accessible information that is provided firstly by the institutional force to each of the actors regardless the legislative environment an organization is embedded in. Examples that were apparent to each of the actors in the EU member states are control-imposed measures that are included in supranational directives (see **Table 3.9** and **Table 3.10**). If not distributed or communicated to foreign actors, the information is not spread. Furthermore, semantics is a key attribute for each of the actors to understand, share, and distribute information unambiguously.

8.3.2 Reflecting Organizational Adoption Characteristics

The reflection of the cases under (A) organizational and (N) network specific characteristics is subject to this section. The results of the reflection are now introduced in Section 8.3.2.1 for organizational characteristics and Section 8.3.2.2 for network characteristics. The approach for presenting the reflection results is the following. If

cases are not specified in the listing, the characteristics are applicable to any of the three cases. The assessment of applicable characteristics is based on the research conducted by the author in the longitudinal study. In order to validate the observations, the research included a workshop that was dedicated to adoption-specific expectations raised by representatives from each of the cases. Besides governmental and business representatives, expectations from the IT sector were collected and included in the workshop. Two software and hardware providers participated. The workshop was facilitated by four academic institutions from The Netherlands, Germany, Denmark, and Ireland (see **Table A.9.12**). Besides the number of actors involved in the case study (see **Table 3.5**), the study expanded by the inclusion of these additional six actors in the workshop. The inclusion of academic institutions served the need to gather an outside in approach and facilitate the conduct of the workshop. The workshop structure and conduct followed the Team Syntegrity Process introduced by Beer (1994) and further extended by Truss, Cullen, and Leonard (2000). Further detail of the procedural aspects of the workshop is provided by Raus, Flügge and Boutellier (2009).

8.3.2.1 Adopter Characteristics

Adopter characteristics were observed in the cases as follows.

(A1) Organizational footprint: Each of the cases was assessed based on size, industry, and institutional characteristics. The result of the assessment concluded in three industries to be involved in the adoption of the innovation: food, beverages, and paper mill processing. Each of the exporting organizations (hereafter declarants and manufacturers) is a multi-national company that is located in a number of countries. The exporters gained economic growth based on their strategic decisions to export and enter new markets. It needs to be noted that each of the declarants is experienced in IS adoption and implemented ERP systems on a global scale. The role of skilled personnel that participated on behalf of their organizations resulted in being an asset to the design and construction of the procedure model. Herein, skills not only related to IS competence or former experience in IS implementation projects, but also the experience in interacting with distinct actors and in particular governmental actors.

(A2) Organizational innovativeness: Herein the innovation characteristics are mapped to the adoption capability of an organization. Each of the characteristics is now further exemplified based on the case study. The relative advantage (A2.1) is set per default by the decision of the EU to implement standard-alike IS applications (TAXUD (2004)). This decision resides in the European Multi-Annual Strategic Plan (MASP) of the

Modernized Customs Code (European Commission (1992)). It is expected to base the design of IS applications for customs management on a common set of functions and application areas (cf. European Commission (2006b), p. 607-608) instead of developing local national IS solutions. This advantage is in general perceived by the participants as a benefit. Participants did not question the decision made by the EU. However, they questioned the order of the prospected deployment of the MASP. Advantage is therefore perceived limited as digitalized forms and electronic information capture are not implemented yet in each of the observed member states. It is expected that organizations experience processing savings, less maintenance efforts and an ease of system operations based on the centralized approach. The provision of information that is required to convince actors of the perceived benefit is still not clear to the participants. Business actors predict that a standardized generic dataset resolves the issue of multiple data sets and error-prone re-entry of data. They perceive multiple data entry, error-prone data exchange due to differing data sets and formats, and higher efforts in data checks and manual corrections. What the participants concluded is the dependency of organizations on the provision of details and specifications by the governmental actors, the customs and tax authorities in this case. Furthermore, the use of a generic dataset as proposed above will be limited if the accompanying legislation does not support its use. Business actors expect financial efforts for the development and operation of the IS application in addition. However, lacking the analysis of business processes, operational and economic parameters, the investigation of this aspect is left for future research.

Concerning compatibility (A2.2), the need of consistency is based on regulatory requirements that mandate a governed process of the perceived innovation. The review of regulatory sources revealed conditions an organization needs to be aware of. Firstly, prerequisites are set on supranational level due to the geographical allocation of an exporting organization to an EU member state. Besides regulation-based triggers to adopt the innovation, inter-governmental organizations have high expectations on standardized procedures and data exchange. Herein, adoption is perceived as a fact an organization need to comply with.

Complexity of the innovation (A2.3) is perceived as a limiting factor by the participants of the study. The impact of the B2G Procedure Model on the operational level requires the acceptance of pre-formatted content. The evaluation cycles that were conducted in the previous chapter revealed the need of intra-organizational compliance with pre-formatted linkages, linkage types and content. Thus, the model could complicate collaboration if common habits in performing business operations and executing procedures in the network were not perceived as a benefit. On the other, the ease of use

of pre-formatted elements as supplied in the B2GPM is considered an enabler to sustain in the market and achieve a competitive advantage by the organization. Competitive advantage herein is the capability of an organization to conduct trade faster and more efficiently. Pre-formatted content streamlines operational activities and accelerates back office processing.

In conjunction with standards (A2.4), managing complexity requires a standardization concept the organizations enable to apply regardless their organizational footprint. Giving access to the B2G Procedure Model, still asks in particular small and medium-sized enterprises to consider the procedural tasks and activities and to identify the individuals that perform them. In case, individuals are unable to follow or resistant to spare time and resources for the internalization of the B2G Procedure Model, a failure of adoption is more likely to happen. A key prerequisite for internalization is the provision of standardized elements in legal sources and their access to any actor. In case of Denmark for example, an integrated project that aligned distinct aspects of customs activities resulted in a high adoption rate. One of the adoption characteristics that were revealed in the analysis of Denmark was the early inclusion of distinct actor roles in the specification of the innovation and the consensus-seeking process (cf. Bjørn-Andersen, Flügge, van Ipenburg, Klein, & Tan (2007)). The adoption rate of MASP applications is comparable once all EU member states completed the adoption. Concerning standards (A2.4), further expectations were raised. These refer to the diminishment of current activities such as multiple data entry, manual data checks, verification of entered data against data repositories, as well as manual handovers of common data sets to multiple actors in the network.

Assuming that the innovation, the model, is perceived a technological edge (A2.5) (see **Figure 7.2**), organizations switch from their actual processing behavior to the behavior as implemented in the model: to use the pre-formatted elements and to follow the order of tasks and activities as illustrated in the work flows (see **Figure A.9.1**, **Figure A.9.2**, **Figure A.9.3**, **Figure A.9.4**, **Figure A.9.5** and **Figure A.9.6**). Based on which arguments or assumptions, is the model perceived a superior standard than the actual one? Still limited by the focus on the design and construction of the B2G Procedure Model, we observed some influencing factors that might facilitate the answer. Overall, the participants as referred to in Section 8.3.2 welcomed the use of standardized procedures. They experienced however different interpretations and a lack of common semantics in their deployment. Procedures hereby embrace data, processes, and forms. In case of forms, actors that conduct customs activities are used to forms and subsequently agree on their use. Forms are typically provided by governmental actors.

They are not questioned by business actors, but become adopted. Procedural activities as for example control- and security-based procedures are apparent to actors that are involved in businesses with the US or Russia. Hence, they accommodated themselves to a procedure presented by a third party. Herein, the process of intra-organizational adoption of the B2G Procedure Model is presumed similar to the process of inter-organizational adoption of forms and regulatory requirements. What hamper the use are potential differences based on import destinations or products that increase the work load of organizations. Herein, the design principles of the B2G Procedure Model made sure that a broader use of the model is feasible. Moreover, the exemplified use of the model in the evaluation cycles could be regarded as introductory or even training material for the change advocates and affected personnel. In order to become adopted by a larger community other than one dedicated network, the determination, definition, and specification of common semantics is an imperative characteristic of technological edges. The ability of the model to become adopted without losing semantics and accepted across industries and organizational sizes is a definitive prove for the technological edge of the model.

The previously assessed characteristics, A2.1 to A2.5 require further phases of trialability (A2.6). Having implemented a web service based demonstrator that imposes common semantics and commonly agreed procedures is still a small, but important step to prove the adoption capability of the model (cf. Flügge, Palme & Schmidt (2009)). Trialability has been conducted in the course of this dissertation. Further details are provided in Section 7.10. The basis for a rigorous trialability exercise in Section 7.10 is not limited to the case study and an experiment (see Section 7.10.4), but extended to the Ghana case (see Section 7.10.6) and a comparison with a similar but different model (see Section 7.10.5). It is recommended to extend trialability to further EU member states. The to-date conducted trialability and the conducted interviews and presentations in course of the ITAIDE research project demonstrated the visibility of the B2GPM and demonstrated the observability capability (A2.7) of the model. Hence, the innovation is made visible to others. Still, further communications to diffuse the B2GPM is recommended. One possible approach concerning the communication of the model is provided in Section 7.10.6.

The degree and impact of innovations on people is a core element of the social analysis (A3) of an organizational adoption process. Reluctance or acceptance of an innovation is highly influenced on the micro level, the users. In a thoroughly conducted change management process, distinct actors are involved in the innovation development, diffusion, and adoption process. Change management projects in a business

environment require the identification and implementation of change advocates (cf. Kalakota, Oliva, & Donath (1999)). The case study revealed that personal interests of organizations limit the usage of a standard if interests are in conflict with the standardization interest of the collaborating community. Further conflict lies in the dissent of an organization's interest and the interest of industry representatives that are involved in the standardization. Same applies to advocates of change on governmental level. The representatives of the governmental actors in the observed cases are examples of the successful implementation of change advocates. Otherwise, it would not have been possible to construct and conduct a research project with that large extent. The influence of individual adoption in this process is apparent in the study by the following reflections. The participants in the study are aware of a required change on the level of individuals that are affected by the adoption of the MASP requirements: changes in job profiles and the shift to control and security specific tasks have been addressed as well as the need for clarity on what is being expected from individuals. Further observations on limiting factors or drivers of adoption based on sociocultural or demographic influence were not possible. Given the focus on inter-organizational processing, a focus on these attributes should be included in future research.

Concerning the procurement model of the B2G Procedure Model (A4), the dissertation leaves this for future research and studies. It is assumed though that the B2G Procedure Model is made accessible to any actors involved in customs management by the publication of this dissertation. The assessment of roles in the five parts of the model (see Sections 7.2, 7.3, 7.4, 7.5, 7.6, and 7.7) indicates the possible involvement of further roles related to consultancy services.

8.3.2.2 Network Characteristics

The network characteristics are as follows.

The institutional analysis (N1) that was conducted in Chapter 6 revealed the institutional footprint for each of the observed networks. Overall, the organizational constructs are business, governmental, and inter-governmental organizations allocated in distinct countries or regions for a local or international reach (see **Table 6.5**, **Table 6.6**, and **Table 6.8**). An analysis of the institutional forces thus the analysis of legislation sources that mandate the deployment of the MASP was conducted, too (see **Table 6.4**). Concerning the MASP relevant implementation projects such as EMCS and AES, they work independently from each other. As participants stated, project plans are poorly choreographed and do not include dedicated intersections and integration concepts to follow the overall

objective of an integrated electronic customs application suite. Not only an integrated business blueprint that covers all MASP relevant activities and functions is missing, but also a MASP relevant overarching data model that forms the basis for IS engineering. Lacking both aspects, the MASP deployment will result in fragmented systems. This observation coincides with a soon-to-be-expected fragmentation of data coherence and date processing. Herein, a successful development and deployment of the MASP-relevant IS application is doubtful. The example of the postponed EMCS (see Chapter 3.4.3) go live date shows that actors tend to postpone MASP relevant activities and implementations or even worse remain inactive. It is not apparent in this stage how an organized feedback to the governmental actors would stress governmental institutions to plan and act accordingly.

Decision makers on governmental level conducted an impact analysis that included an analysis of the economic impact of the innovation (N2) (cf. European Commission (2006c)). In that assessment, governmental decision makers expect an increase of financial resources to support new policy initiatives and the deployment of the MASP applications (ibid., p. 4). Through the provision of a paperless, standard-enabled customs management (cf. European Commission (2005c), p. 18), the prospected return on that investment lies in ensuring safety and security of constituents as well as legal trade, protecting financial interests and increasing the competitiveness of organizations (cf. European Commission (2006c), p. 10-13). A further assessment of the economic impact is limited at this point. Herein, it is required to reveal insights into financial data that were not subject to the case study.

The relevance of interconnectedness (N3) has been proved as beneficial to innovation adoption in this dissertation. To assess the impact of the B2G Procedure Model, the connectivity among business actors weighed as important as the interconnectedness between governmental actors and non-governmental actors (see **Table 3.1**) (cf. European Commission (2007a), p. 7-9). Interconnectedness is also proved relevant by the high number of analyzed interactions between actors (see **Figure 6.14**). Herein, the connectivity of non-governmental actors to governmental actors stimulates the adoption. The interconnectedness on technical level is further proved a stimulus for adoption. As exemplified in **Table 3.14**, technical interconnectedness appears in form of standardized login procedures and system interfaces that connect ERP-systems of distinct actors. On the operational level, the synthesis of customs-relevant process steps illustrates the high interaction among the actors (see **Figure 3.8**). The analysis of the process steps demonstrated the connectedness of the actors by sharing data and information and processing these further. Connectedness by more than two actors takes place to provide

services between banks, health authorities, the national customs office, the manufacturer, the service provider, and further actors. Overall, interconnectedness can be measured by the degree of connected multi-site, international, and integrated applications, and in particular the ratio of pairs of nodes that are mutually reachable to total number of pairs of nodes (cf. Brass (1995), p. 8). Interconnectedness is also a measure to describe the density of collaboration meaning to which extent actors are linked, directly or indirectly, to other actors based on the possible links in a network (cf. Boutellier, Flügge, & Raus (2007), p. 12-14; Brass (1995), p. 5-6; Changizi, McDannald, & Widders (2002), p. 218). However, in case of a single export event such as a single sales order, a B2G network forms to serve the purpose of the event and decomposes after concluding the export to the final destination and the corresponding customs management activities. The question is if the adoption of this innovation is less desirable in this case. Business and governmental actors do not remain connected in the network. They do not collaborate further unless another export event occurs.

A detailed analysis of social aspects (N4) as for example the participation of members of an organization in informal networks that drive the adoption did not take place. However, the study gave some hints on the positive correlation of social aspects to successful adoption. Following governmental actors in particular the Dutch customs authorities, individuals participated not only in the Dutch network, but also participated in the Danish network. Firstly, one reason for participation was the high interest of sharing and facilitating the exchange of ideas on the adoption of the innovation. Secondly, the social network that resulted from the interest of customs authorities on common themes regardless their geographical position. Governmental actors shared also the interest in supporting business organizations in the conduct of customs operations. Furthermore, one workshop that was conducted to inform the Danish IT Agency about the research activities revealed the interest of individuals to participate in informal networks. Other individuals in the assessed use cases collaborated for further project opportunities. Still, a deeper analysis is required to assess social networks and the role of individuals on organizational adoption.

8.3.3 Reflecting Drivers and Barriers of Organizational Adoption

The elaboration on adoption characteristics in the previous sections disclosed driving and limiting attributes of organizational adoption characteristics. Firstly, this section is dedicated to derive these attributes from the use cases, provide an overview, and assigns attributes to adopter and network characteristics. Secondly, the overview gives feedback

of the applicability of the observed adoption measures in the generic reference framework.

Based on the previous assessment in Sections 8.3.2.1 and 8.3.2.2, driving and limiting attributes of organizational adoption characteristics are now assorted accordingly. Drivers and barriers of adopter characteristics are shown in Figure 8.3. Figure 8.4 summarizes drivers and barriers of network characteristics. In both figures, a minus ("-") stands for an experienced limitation of a characteristic. A plus ("+") indicates an encouraging aspect. In case a characteristic could encourage but also limit the adoption, it is marked with a plus/minus ("+/-").

The illustration of network- and adopter-related characteristics (see Figures 8.3 and 8.4) reveals a high connectivity between an organization and the network or networks the organization belongs to: mostly commonly noted organization-specific aspects are strategic decisions to strengthen economic growth by entering foreign markets, social and networking skills of employees, and the cultivated IS legacy as an organization and diffused by individuals into the organization and into the network.

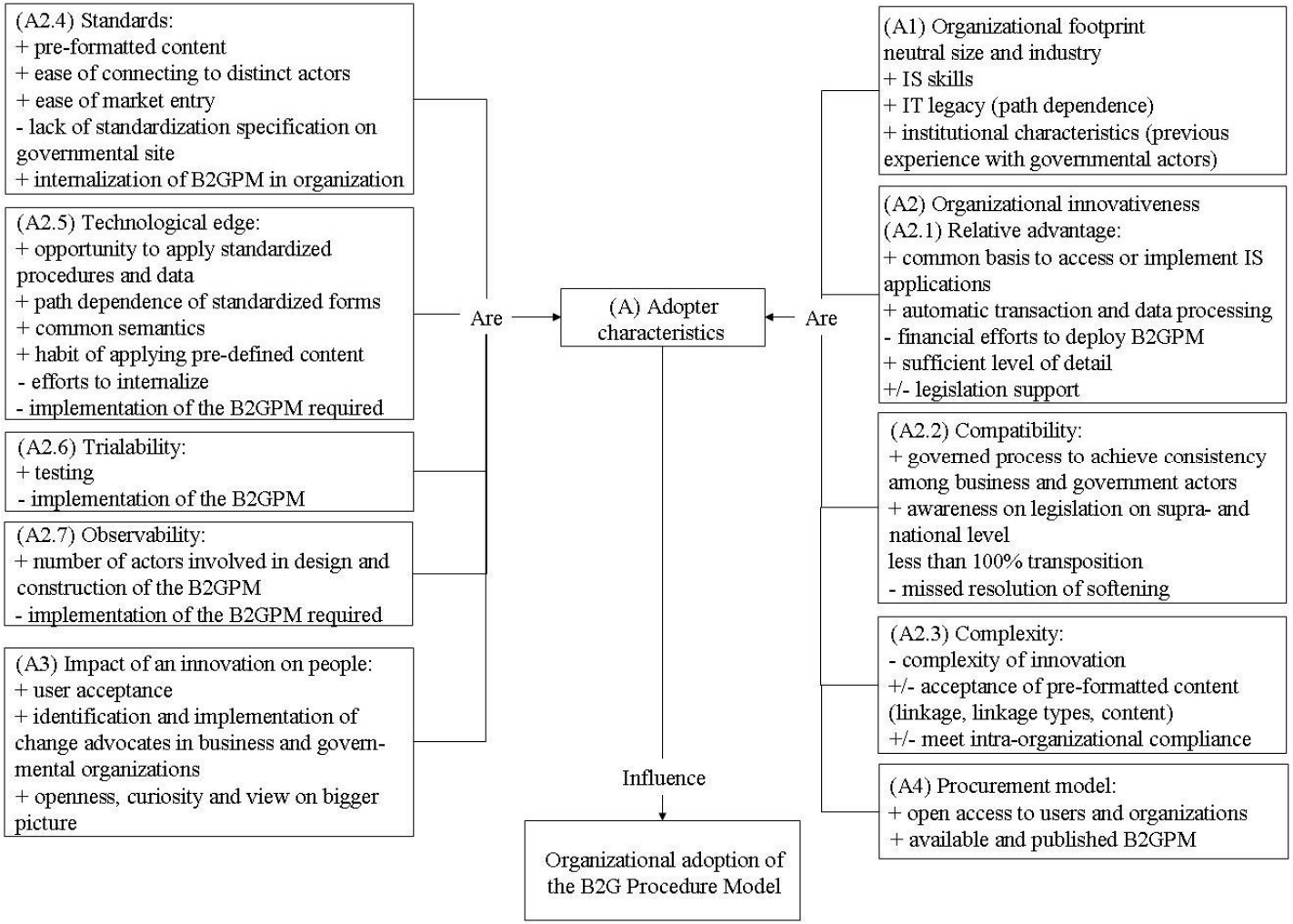


Figure 8.3: Adopter-related drivers and barriers in organizational adoption

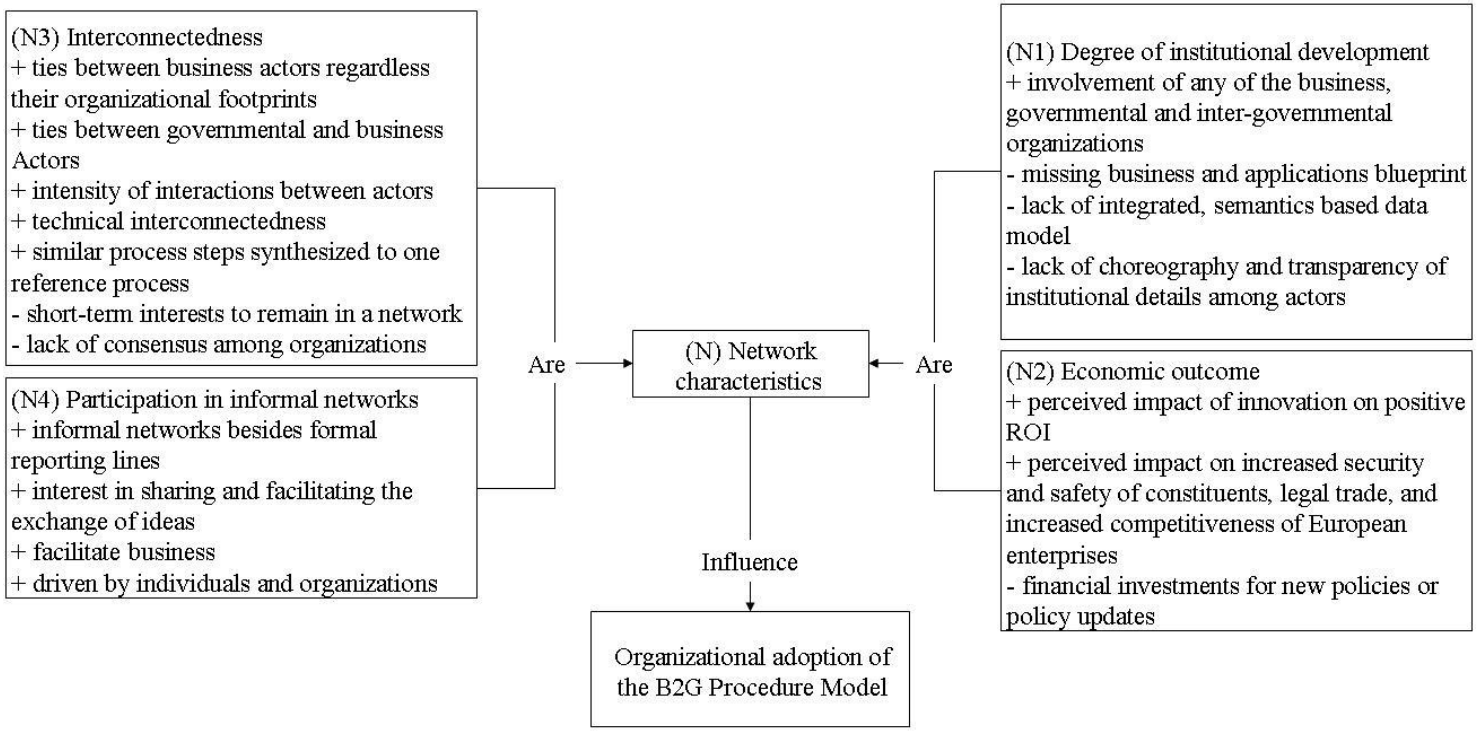


Figure 8.4: Network-related drivers and barriers in organizational adoption

8.4 Concluding on Organizational Adoption in the Reference Framework

The selection of the cases allows reflecting on drivers and barriers from a reference framework point of view. The reference framework was introduced in Chapter 3 (see **Figure 3.2**). Herein, the reference framework that represents customs-oriented B2G collaboration is now assessed by the named organizational adoption characteristics. The alignment of organizational adoption characteristics shows that both adopter and network related adoption characteristics are required to influence the regulatory environment, stakeholders, and the trade chain. Two directions of influence are revealed: adoption characteristics that are the basis to equip stakeholders to design, test, adopt and refine the B2G Procedure Model and adoption characteristics that affect stakeholders and their inter-organizational operations (Figure 8.5). For further details, see Sections 8.3.2.1 and 8.3.2.2. Compatibility, the degree of the institutional development, and the perceived economic outcome are key characteristics of the innovation that set the ground for the adoption of the B2GPM. As illustrated in previous discussions in Sections 8.3.2.1, the source of compatibility in a B2G collaboration is the regulatory environment.

Furthermore, the discourse on adoption disclosed differences in organizational constructs where governmental actors influence through regulatory anchor points the collaboration. The level and intensity of influence have been proved by the analysis of regulatory sources in the case study and the consideration of additional legal sources (see **Table 6.4**). Not only the design, but also the enhancement of the B2GPM would result from an integrated, inter-organizational adoption of the B2GPM. A stakeholder-type-centric or single-stakeholder-based adoption could not stimulate the network to adopt the model unless the governmental actors become involved in the adoption process. Compatibility herein was observed to require that level of inter-organizational adoption of the B2GPM. Now, Figure 8.5 illustrates the discussed alignment and references for further details **Figure 8.3** and **Figure 8.4**. Drivers and barriers of organizational adoption are tightly linked to the adoption on the micro and macro level. The individual user becomes as involved in adoption as the governmental authorities that provide and feed the governmental environment in which actors are embedded in customs management. Herein, similarities in organizational adoption were revealed between business actors and governmental actors. Those refer to the capability of an organization to innovate and deploy and to engage individuals that share a common interest in facilitating trade. Concerning the capability of organizations, the case study included different sizes of organizational actors, multi-national companies that export

and small and medium-sized enterprises that are part of the collaborating network. It needs to be noted that emphasis of the research is taken on multi-national companies. Still, conclusions could be used to apply the revealed organizational adoption characteristics in another organization type other than those that were in focus of the case study. It is recommended to conduct SME-specific research on the applicability of the B2GPM and hereby consider few, but existing scientific contributions (cf. de Vries, Blind, Mangeldsorf, Verheul, & van der Zwan (2009)) to the field of IS standards research in SMEs.

The assessment of drivers and barriers pointed to the relevance of standardization as an essential first step to achieve adoption of the B2GPM among actors. With the first step, actors within the trade chain develop or harmonize standardized ways of structuring data, forms, and public processes by applying pre-formatted content. Further steps are envisaged. By establishing the B2G collaboration, actors harvest the benefits of standardization and begin to interconnect data, forms, and processes. Hereby, the process of internalization within an organization is a prerequisite to facilitate the adoption of the B2GPM externally across the trade chain partners. In the third step, collaboration is increasing and actors experience the benefits of standardization and connectivity by assessing new collaboration opportunities.

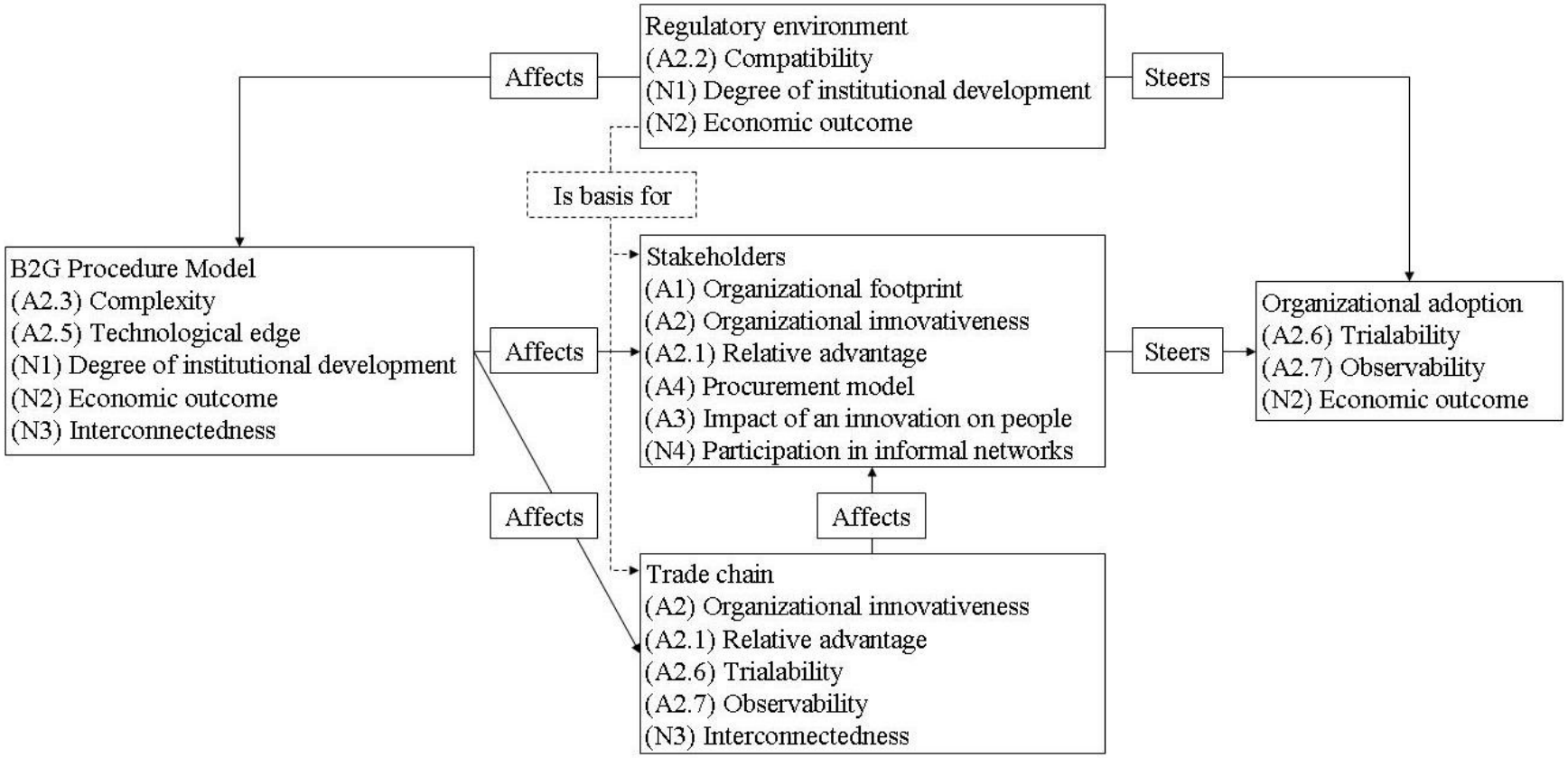


Figure 8.5: Organizational adoption in the customs-related reference framework

Further benefits in form of business transformation opportunities could be expected. The three steps or forms of transformation as introduced in this dissertation point to observations made by other researchers as for example in the studies of Venkatraman (1994). Herein, the studies of Venkatraman refer to some aspects that are required to enable business transformation (ibid., p. 74): it is expected that an organization emphasize the impact of a standard internally. Furthermore, benefits in business transformation according to Venkatraman result from a systematic assessment of a business network, its participants, and the purpose of the network (ibid.). The B2GPM contributes to these considerations by proposing a structured, in depth-described and workflow-enabled model in form of tasks and activities. Comparing the findings of Venkatraman to the B2GPM, the B2GPM concludes with the outlook on business network redesign but in a standard-enabled format. Unlike Venkatraman, who does not specify the role of governmental actors the B2GPM reveals the need of governmental inclusion on inter-organizational networks. Furthermore, the B2GPM approach combines network design and standardization principles in the newly introduced design principles of the B2GPM. The B2GPM resolves two identified weaknesses of business network redesign (ibid., p. 83): (a) the missing well-coordinated approach and (b) the missing link to internalize network-based IT demands in an organization. Concerning (a), Venkatraman points to the need of a well-coordinated approach to involve collaborating partners in a systematic and supporting way (ibid.). This approach has been provided now with the dissertation and is detailed in Chapter 7. With respect to (b), the evaluation of the B2GPM points to internalization relevant tasks that should be conducted. Examples of them are outlined in Chapter 7 as well.

9 Critical Appreciation and Future Directions

The objective of the final chapter is to clarify findings of this work and relate the research question to its objectives. The chapter is structured as follows. Section 8.1 summarizes the key results of the work. Section 8.2 answers the research question and sub-questions. Section 8.3 discourses the contribution of this work by reflecting on institutional facets of collaboration research. Section 8.4 summarizes the theoretical contributions of this work and Section 8.5 the practitioner relevant contributions of this work. If not outlined explicitly, each of the sections add to the previously conducted learnings and findings in each of the chapters and sections.

9.1 Summary of the Dissertation

Chapter 1 presents two gaps in B2G collaboration research. In field of practical research, companies find it time and resource consuming to enter foreign markets and ensure regulatory compliance end-to-end. Small and medium-sized enterprises hesitate in pursuing new trade opportunities due to increasing demand in providing a number of data and documents to governmental authorities. Multi-national companies aim for pre-formatted and bundled transaction processing to streamline regional export activities and to avoid multiple data entries and validation. Customs organizations aim to fulfill regulatory requirements where needed and necessary. The growth in international trade asks for doable and standardized IT means that allow customs officers and service providers to interact and collaborate with the least paper-based and physical expense required. IT standards emerging from EDI influenced over the last decades the formation and maintenance of vertical, industry oriented networks. Standards that succeed in the facilitation of inter-organizational B2G networks can play an imminent role for preparing an organization's readiness for export. Governmental authorities such as customs become an integral partner in business networks. The Modernized Customs Code for example attests that customs play "a leading role within the supply chain and, in their monitoring and management of international trade, making them a catalyst to the competitiveness of countries and companies" (European Commission (2004), p.4).

With respect to the scientific research gap, cross-organizational models that accommodate B2G collaboration forms are missing. The emphasis on regulatory and standard aspects in cross-organizational models is still B2B driven. It is questioned if and how a cross-organizational model for B2B becomes adapted to B2G or if a different approach needs to be taken. Scott's Analytical Framework II (AF II) raises the appropriateness of standards as carriers to facilitate inter-organizational B2G

relationships. It takes into account the density of organizational engagement in business and governmental activities. Accordingly, Scott points to the role of carriers that help to transmit regulations to trading organizations preserving collaboration relevant constructs (cf. Scott (2001), p. 48). Still, AFII is made available in a descriptive, unformatted manner and is therefore vague to be implemented on larger scale. Sources about its usability to investigate the role of standards in B2G further are limited. The institutional aspect of B2G collaboration formation is missing. The institutional role of standards in B2G requires further clarity of the role of standards in IS research. The role of standards in IS research was shaped by research contributions that focused on industry-specific collaboration scenarios.

Chapter 2 provides the reader with an introduction into IS standards research, the embeddedness of standard themes in IS research, and the institutional viewpoints in IS research. Standard-relevant IS themes follow more and more the lifecycle phases of a standard that consists of initiation, development, deployment diffusion, and discontinuation. Deployment herein refers to the implementation of a standard. The lifecycle-based approach broadens the research spectrum of IS standards research and invites further aspects of the standardization lifecycle than the rather traditional focus on diffusion and deployment. The lifecycle-based approach coincides with the findings of Vessey et al. (cf. Vessey, Ramesh, & Grass (2002)) in the sense that multiple disciplines such as organizational and strategic management as well as new institutionalism support standards relevant research in intra- and inter-organizational aspects. Standards relevant research themes benefit from inter-disciplinary viewpoints, namely institutional, socio-economic, and strategic theories. They could be of managerial, legal, ethical, political, and cultural origin. Through the lens of new institutionalism, legal implications are notably included in organization-specific IS research (cf. Vessey, Ramesh, & Grass (2002), p. 48). By regulatory requirements, actors are bound together. In fact, legally imposed IS research drives inter-organizational alignment in form of collective actions and steers the success of standards in a network. Concerning levels of institution-based analysis, institutional theory is applicable to individual, micro, meso, and macro levels of analysis (cf. Henriksen (2002), p. 172-175). Individuals refer for example to constituents and users. The micro level of analysis embraces organizations and intra-organizational IS viewpoints. The suitable fit for the dissertation's objectives is the meso level of analysis, the inter-organizational collaboration among actors.

Serving the complexity of institution-based IS research a choreographed use of research methods is required to respond to that research objective. Framed in a design-driven and qualitative approach, institution-based IS research benefits from the study of practical

and theoretical needs in the observed field of business-to-government collaboration. Applicable research methods are case studies to examine inter-organizational collaboration in export and in particular export management, secondary data and interviews to accompany, add, and validate the case study results, as well as literature analysis to analyze, critique, and extend existing related work. The research objectives drive the research approach for the dissertation. Concerning the proposed artifact, the B2G Procedure Model, a design-based approach is envisioned. The evaluation of the artifact is based on five principles of evaluation. These serve to compare and contrast the procedure model with other models or respective evaluation criteria, to meet the claimed collaboration and stakeholders' needs, to study the fit of the procedure model with the real-world setting, and to communicate clearly the results and their reuse.

As presented in Chapter 3, a longitudinal case study in customs management serves as the entry point to the research in this work. The study is the basis to underpin the multi-dimensional character of B2G collaboration. Three different network formations that have been observed over a period of 36 months provide substantial data material for the assessment. The networks are set in place under traditional B2G collaboration conditions, paper-based, and based partly or exclusively on proprietary IT-solutions. Along the discourse of the study, network, process, data, actor, and linkage analysis resulted in a pre-formatted reference framework to assess further the applicability of IS standards. Each of the three networks, though embedded in industry-specific environments, accomplish B2G collaboration conditions. The generic character of the procedure model results from the application of three distinct export-import scenarios with a range of 5 to 15 observed actor types. Actor types represented five national regulatory requirements and distinct levels of IT-readiness. The development of a reference process facilitates the alignment of case study based network conditions with those needed for any B2G collaboration. Actor types that participated in the study equally belong to the governmental and business domain.

The case study revealed two viewpoints of customs related process management, private and public. Private processes are subject to intra-organizational operations and are maintained individually. Once relevant to the external collaboration, business processes turn public. The example of B2G collaboration illustrated the separation of viewpoints and denoted the core activities that are conducted to become aware of the private and public processes. The relevance of public process analysis in IS standardization raises the question of including public process elements into IS standardization activities or not. The study revealed that public process elements are relevant and become critical to denote the scope of an open standard not only from a technical, infrastructural

perspective but also from an inter-organizational management perspective. Standards become a means to encapsulate collaboration relevant activities in the public part of processes. In alignment with the proposition of institutional carriers, standards could function as carriers of process information among collaborating actors.

Chapter 4 provides the reader with the basics of inter-organizational networks, formation criteria, and the applicability of formation criteria such as regulations in B2G collaboration forms. Collaboration is understood as any cooperating and competing activity that serves two or more actors in a given network. Actors are commercial and governmental organizations. Actors share a common view on what needs to be shared in the network to cooperate in customs management. To respond to the required insights in regulative forces, four geographical types of regulative forces have been identified: supranational, federal or national, state, and local level. The named types are representing statutory law that is enacted and constituted by legislature. The applicability of trade relevant statutory law depends on the selected implementation variances and the degree of transposition in particular. Transposition of supranational to national legislation is hereby used as a maneuverable margin as to which extent supranational directives become enacted on national level. In customs, the degree of transposition-dependent adoption steers the national, international, and supranational handling of trade. Among other concepts, two key concepts of regulative foundations have been identified to further investigate B2G collaborations in the subsequently following rounds of design: the Revised Kyoto Convention issued by the WCO (cf. WCO (2000), p. 4; WCO (2004), p. 80; WCO (2006a), p.5) and the Modernized Customs Code issued by the European Community (European Commission (2004)),

The investigation of structural elements of a collaboration resulted in the following elements: network formation (network initiation), actor relevant types (individuals, organizations, organizational populations), characteristics and roles (alike or distinct organizations), how access is provided to the network (polycentric or focal), collaboration direction (horizontal, cross-level), and network-related factors that influence actors and the collaboration. The investigation resulted that networks that are initiated by regulative forces have a close fit to those network forms that are described by Scott's Analytical Framework. However, one of the constraints in B2G research is that research in standard-enabled B2G network initiation and formation is still related to B2B network research. Main reason is the focus of B2B network research on vertical standards and their impact on collaborative thus industry-led environments. The role that actors perform in a B2G network is directly linked to the position of actors in the network. Either isolated or connected to a small number of actors, actors have weaker

and less dense relationships than actors that act as gatekeeper or star in a network. Related work attests that networks that transform through IT need to consider network size, connectivity, and density (cf. Markus, Minton et al. (2006), p. 33; Markus, Steinfield, & Wigand (2006), p. 88-89; Mignerat & Rivard (2005), 13-14). The influence of governmental actors in a collaboration required a collaboration format that copes with the influence of regulative forces on business as well as governmental actors.

Chapter 5 provides the reader with the basic concepts of standards. The concepts cover standard types, building blocks, and effects that standards cause in organizations and networks. The chapter further discussed network effects of standards. Overall, standards refer to established norms or requirements. A more refined definition of a standard is proposed by de Vries ((1999), p. 15): a standard is an „approved specification of a limited set of solutions to actual or potential matching problems, prepared for the benefits of the party or parties involved, balancing their needs, and intended and expected to be used repeatedly or continuously, during a certain period, by a substantial number of the parties for whom they are meant“. Standards are built in products, procedures, IT, and processes. Three classification schemas are found applicable to address standards: the origin, the application, and the openness of standards. Still limited to B2B driven research, the field of IS standards research in a B2G environment gained from the wide body of research on UN/EDIFACT. It helped to pace the research on inter-organizational collaboration mechanisms. Under the lens of open attributes of standards in inter-organizational collaboration, the effects that standards cause are being studied: effects of standards on a single business partner in a network (cf. Katz & Shapiro (1986), p. 825-826; (1994), p. 101-102), financial implications of standard development and delivery (cf. Buxmann et al. (1999), p. 137), as well as open in terms of open meeting, consensus, due process, open world, open intellectual property rights, open change, open documents, open interface(s), open use, and ongoing support (cf. Krechmer (2006), p. 48).

With respect to B2G collaborations, standards account for a perceived value of the standard. Once being used in collaborations, it expected that standards lead to a reduction of adoption and maintenance costs. However, the economic value of standards in B2G so far has not been analyzed. The growing number of SDOs and therefore increased offering of standardized elements raises the concern that B2B and B2G networks and individual organizations become swamped with overlapping and opposing elements. The scope of economics in B2G collaborations is beyond the scope of this work. It is recommended to study this field further. The assessment of related work provided insights into the role of standards (cf. Markus, Minton et al. (2006); Reimers

(2003); Zhu et al. (2006)). The comparison concludes two observations. Firstly, IS standards usage depends on structural conditions of a network such as network size and installed base, types of stakeholders, as well as mode of interaction resulting in network density. Secondly, IS standards usage requires bilateral agreements among trading partners prior to the formation of the collaboration. With respect to the agreement on standards, related work raised the need to gain more insights in the process of standard development. Concerning actors involved in standard development, the work proposes a schema to reveal actors and align actors to actor types. It covered the role of governmental actors and gives insights into actor types based on the example of the organizational part of standardization in the US Government. The standard development process is illustrated based on the example of the Open Development Process of UN/CEFACT.

The core part of this work is the design, development, and construction of the procedure model that serves standard-enabled B2G collaboration, the B2G Procedure Model (B2GPM). The construction takes place in two rounds of design (Chapters 6 and 7). A comprehensive analysis of regulatory requirements and the longitudinal study of three cases concluded in 108 linkages and 57 linkage types by which business and governmental constructs collaborate. Concerning governmental and business actors, the model takes into account 45 organizational constructs and the exchange of 7 content types. Resulting from previous findings the work introduces seven design principles that were reiterated in the second round of design. Those derive from the modeling of any collaboration element according to the guidelines and recommendations provided by Scott in his work on institutional theory in network formation. Scott provides AFII in a textual descriptive format. This work contributes an artifact with the formal and graphical depiction of B2G relevant organizational and institutional constructs in a comprehensive format of a B2G Procedure Model. The design elements of the procedure model emphasize the use of IS standards in a sense that they are clear, concise, and repeatable sequences of specifications and that they are offered free-of-charge to the audience. The use of standards as proposed in the procedure model is voluntary however explicitly perceived as beneficial and therefore recognized as a public good. The organizational constructs in the procedure model emphasize the stakeholders as identified in real-world settings: business, governmental, and academic partners, as well as standardization bodies, trade and industrial associations. Addressees of the model to-date are rather multi-national companies than small and medium-sized enterprises. Limitations to certain industries were not experienced. According to the real-world setting, the feasibility of the use of the standard-enabled procedure model

senses dependencies on network size, the installed base, the applicability of standards' use among the stakeholders, and the above-identified network participants.

The insights into the real-world settings as in case of the reference framework emphasize the preciseness of definition and description of the institutional constructs of the procedure model. Preciseness embraces clarity in regulations, inter-organizational process descriptions, and intra-operational activities that are steered by each of the stakeholders individually. Herein, preciseness follows the principles of semantic unambiguity. The transition from directives to standards and vice versa requires further observation by applying the procedure model. If not directly regulated, standards are optional and therefore constrain the utility of the procedure model as prospected. The chapter concluded the construction of the model with a comprehensive round of evaluation. The B2G Procedure Model passed the evaluation successfully and demonstrated its reuse in distinct scenarios other than the use cases. Moreover, the construction of the B2G Procedure Model accomplished the Guidelines of Reference Modeling.

In Chapter 8, an investigation of the potential of organizational adoption of the B2G Procedure Model was carried out. Firstly, a brief theoretical outline on the adoption criteria and subsequently relevant criteria for organizational adoption in a B2G network were elaborated. Hereby, the analysis of related work resulted in four adopter and four network characteristics. Secondly, each of the criteria was applied to the cases. This exercise resulted in the introduction of drivers and barriers that influence the adoption of the B2GPM on organizational, network, and in fact individual level. The individual user is a critical influencer on organizational adoption next to governmental authorities. The reasons are in the user's social interconnectedness to actors that are involved in customs but also his capability to promote on IT, process, and data levels the impact of the B2GPM. Herein, similarities in organizational adoption were revealed between business actors and governmental actors. Those refer to the capability of an organization to innovate and deploy and to engage individuals that share a common interest in facilitating trade. Governmental authorities on the other hand play an important role in adoption as they provide and feed the governmental environment in which actors are embedded in customs management.

9.2 Explicit Answers to the Dissertation's Research Questions

The primary goal of the work was the investigation of IS standards in B2G collaborations. The corresponding research question is:

- How and under which conditions do IS standards contribute to the effectiveness of B2G collaborations in customs management?

The research question subdivides into further questions that support the clarification of above-outlined collaboration characteristics and interdependencies:

- Question 1: What are the characteristics of B2G collaborations in customs management?
- Question 2: What are the effects IS standards have to-date on the collaboration between businesses and customs organizations?
- Question 3: What are the prerequisites for a standard-enabled, customs-focused B2G Procedure Model and what does it look like?
- Question 4: What factors contribute or impede the adoption of the B2G Procedure Model?

In the following, the research questions are answered explicitly.

9.2.1 Question 1

The answer to question 1 is the following. Unlike B2B collaborations, B2G collaboration has an institutional character. By differentiating normative, regulative, and cultural-cognitive institutions, regulatory forces bind collaboration partners together in the field of customs management activities. The nature of interwoven institutional types such as normative, cultural-cognitive, and regulative, makes it difficult to leverage one specific institutional type to determine its impact on the initiation and formation of B2G collaborations in the organizational field of customs. The difficulty lies in the governmental pluralism in networks and the distinct roles governmental actors play in networks (cf. Kettl (2009), p. 10-12). By acting according to common beliefs and logics of action, cultural-cognitive institutions steer the common sense of actors and the willingness to collaborate. It is a common belief among actors that export increases sales and provides opportunities for market entry and economic growth. Customs therefore stimulates or hampers successful export. By agreeing on that baseline, actors form the collaboration to export. Through the institutionalization of export relevant structures, rules, and procedures, these become accepted in a normative, regulative way.

Another B2G characteristic is the inclusion of governmental actors on an international scale. Governmental actors are for example customs offices, security units, and goods controllers from an exporting and importing viewpoint. Governmental actors are directly involved and part of an international trade related supply and value chain of manufacturers, declarants, and transporters. In B2G collaborations, trade related structures become active, stimulated, and changed through regulatory forces and further legally binding constructs. As shown in the dissertation, B2G collaborations are legitimated by regulatory forces on a local and international level. Regulatory forces include directives and recommendations. They are applicable once they are being transposed to local legislation. In this case, regulatory bodies are a direct partner of non-governmental actors and are capable of preserving and influencing the performance of other actors in the collaboration. Non-legitimated B2G collaborations are unlikely to form. One example of non-legitimated B2G collaborations is illicit trade. In another case, collaborations are hampered or unlikely to be formed. The elements of legitimacy and compatibility strengthen the argument for regulatory forces as a key characteristic of B2G networks. However, collaboration forms might vary in other organizational fields and herein the character of regulatory forces varies. That leads to the assumption that collaboration formation is either claimed through governmental dominance or leveraged through self-enforcing mechanisms of alliances and interest groups.

9.2.2 Question 2

The answer to question 2 is the following. Customs organizations stimulate the use of IS standards. They allow to include standardized content (process, data, and messages) and transmit it to the collaborating actors. Unlike standards effects in B2B collaborations, those IS standards that are capable to transmit regulation-based content enable B2G actors to comply with regulations and conventions. The role of standards in B2G collaborations becomes clearer if they are being directly covered, addressed, and detailed in regulatory forces. In this case, standards transform into an institutional B2B characteristic. Otherwise, their role as B2G characteristic is vague. Their unconditional use to form B2G collaboration is not tested yet.

To ease standard-enabled collaboration, actors need to agree upon the use of IS standards. Standards are applicable to serve that role under a conditional framework. That framework refers to the elements of IS standards frameworks and the acceptance and deployment of these elements among actors. Regulatory forces have the power to include these elements in their regulatory texts. Still, actors and especially IS providers

decide upon the use, applicability, and variance of the standard's deployment in their IS offerings. The ideal world applies a legally imposed, pre-defined set of elements that follow standardization principles regardless in which industry or region actors are embedded. Realistically, a hybrid approach that eases the convergence of standards to one meta-standard is expected to become deployed. Herein, the research in convergence of vertical standards will benefit from the demand of regulatory requirements to overcome sectoral hurdles and interests. If convergence fails, the number of proprietary standards increases, the fragmentation of IS applications in the organizational field of export stays, and the demand for standard-enabled B2G collaborations remains unresolved.

9.2.3 Question 3

The response to research question 3 required the analysis of elements that suit the construction of a B2G-relevant collaboration framework. This work investigated B2G collaboration forms in a longitudinal, international case study. Furthermore, the spectrum of analyzed networks was rigorously enlarged by adding further regulations and supplementing material.

The answer to question 3 is the following. The role of regulations and publicly shared content triggered the investigation of corresponding elements in institutional theory. The review of new institutionalism as propagated by Scott and its analytical approach of multiple layers of organizational collaboration showed the relevance for and appropriateness of Scott's approach to this work. A profound and systematic analysis of organizational and institutional constructs led to the construction of a novel form of a B2G collaboration framework. Herein, standards appear as medium types. Amongst unspecified, paper-based, and non-standardized medium types standards show the potential to become an institutional carrier of regulatory requirements or in other words to be a connector between actors. The use of standards is not hampering, but fostering B2G collaboration as tested in the evaluation cycles. Its use however is not mandated but required. The distinction of both concepts, mandated by national legislation and required by supranational law, is made in the present available export and customs legislation on EU and national levels. The required use lacks the level of detail and the provision of a specification of standardized elements.

9.2.4 Question 4

The answer to question 4 is as follows. The shift to mandate standards in B2G collaboration requires a common approach by supranational and national forces. Both adopter and network related adoption characteristics are required to steer the approach. Two directions of influence were identified: adoption characteristics that are the basis to equip stakeholders to design, test, adopt and refine the B2G Procedure Model and adoption characteristics that affect stakeholders and their inter-organizational operations. Legal forces need to present and diffuse regulatory anchor points in a format that is being understood by the actors regardless their position in the collaboration. The adoption of the B2GPM results from an integrated, inter-organizational adoption of the B2GPM. A stakeholder-type-centric or single-stakeholder-based adoption could not stimulate the network to adopt the model unless the governmental actors become involved in the adoption process. Herein, a standard-enabled B2GPM requires interoperable standards that are aligned among actors. One possible concept that was introduced in this dissertation is the concept of the meta standard (see **Figure 7.9**). Once having reached an agreement to apply a meta standard, software providers sense the urgency to deploy these standards and issue them to the market as open standard-enabled offerings. The answer to the question how to include standards as medium types is provided in form of a meta-model and a procedure model for B2G collaboration. Both models are explicitly described, documented, and evaluated in this work.

9.2.5 Research Question

The how and conditions under which IS standards contribute to the effectiveness of B2G collaborations elaborate from the answers given to Questions 1 to 4 and are the following:

- Standards have the capability as demonstrated in the B2G Procedure Model to act as carrier that transports data or information among collaborating actors. In one scenario, a standard contains regulations or regulatory elements such as content and legally required operational activities. In that scenario, regulations and the required standard are directly linked. Another scenario is possible in which standards facilitate trade-related structures among actors, but are not directly related to regulations. In the latter scenario, the effectiveness of a standard-enabled B2G collaboration is highly dependent on the consensus and agreement of the actors to apply the same standard or interoperable standards. Moreover, the benefit and herein the usefulness of the standard need to be provided to the actors. Otherwise, they remain in their

existing procedural environment or become dominated by other than regulatory actors. The observations in networks a), b), and c) (see **Figure 3.13**, **Figure 3.14**, and **Figure 3.15**) demonstrated the negative effects of a partly used standard that lead to further unclear to-be-exchanged content among actors and result in a semi-manually processed collaboration. Herein, the role of standards in the observed context of export is vague. More clarity about the institutional character of IS standards is required to investigate the role of IS standards in B2G collaborations.

- Following institutional theory, institutions are trade-related structures (supply, distribution, and control chains for example) that bind governmental and non-governmental actors together. Trade-related structures become activated, stimulated, and changed through regulations such as the Modernized Customs Code and further legally binding constructs such as directives and recommendations. Herein, trade-related structures thus institutions are a prerequisite for customs-related B2G collaborations. Moreover, trade-related structures are a prerequisite to assess the role of standards in B2G collaborations.

- Compared to IS standards, regulations as such initiate B2G activities on an international scale. They serve as institutional carriers and enable, facilitate and if followed correctly do not hamper the realization of B2G collaborations. One example of regulatory-based limitation of B2G collaborations concluded from the security measure that was issued by the US Customs and Border Protection[7]. If other regulatory forces have a similar effect in trade limitation, that needs to be observed. The example showed that regulatory forces have the potential to influence or even change trade patterns and herein increase or decrease the level of operational activities within and among organizations to institutionalize that regulatory force. Hence, the analysis of regulations is necessary to gather details of trade patterns and the resulting B2G collaborations.

- Regulations influence B2G collaborations. Regulatory bodies are a direct partner of non-governmental actors and are capable of preserving and influencing the performance of other actors as illustrated in the case study. This observation is made apparent throughout the dissertation. Moreover, the dissertation showed that regulations embrace, regulate or point to the use of standards in B2G collaborations. Thus, IS standards influence B2G collaborations, too. Herein, there is variety of how

[7] http://www.cbp.gov

regulations influence standards. An essential condition to increase the effectiveness of IS standards in B2G collaborations is the clarity of regulations and the content that bind the actors together. That content could be standardized as shown in the dissertation. In the case study, the observed regulations regulate actor-to-actor relationships and delineate IS-enabled collaboration. However, they lack specifications of the standard and do not outline how to diffuse the standard among the EU member states and the business actors.

- Besides the clarity of regulations, the standard(s) that are able to carry pre-formatted content need or even more require the acceptance of the participating stakeholders. That relates to any stakeholder regardless the domain to which the actors are allocated: business, governmental or inter-governmental. Upon the acceptance of the known participants, business stakeholders that enter new markets would expect from the additional collaborating partners as for example customs organizations in the targeted countries and the shipping agents that facilitate the shipments to accept these standards as well. The same applies of course to existing networks. The conditions under which the standards are accepted were discussed in the dissertation, too. Herein, standardization takes place not only on a technical level. The inclusion of semantics and pragmatics is supposed to gain higher flexibility in collaboration formation and expansion. It is expected that collaborations establish faster and with less effort than without the provision of common semantics and agreed pragmatics. Pragmatics are a key factor to define the correct usage of information (cf. Reichwald (1993); Schmaltz & Hagenhoff (2003); Weigle, Schwarzer, & Krcmar (1997) and not to transport pre-formatted content between collaborating actors differently.

- Next to the recognition of content, regulations, and IS standards in B2G collaborations, IS standards require a formal if not a governmental acceptance prior to the establishment of a B2G collaboration. Known standard development processes do not necessarily align standardization requirements with existing, planned, or updated customs regulations. Though national differences exist, the Modernized Customs Code could foster standards' usage and enable 27 member states and the collaborating partners on a global scale to collaborate in a coherent, standard-enabled and efficient manner. The dissertation proposes to better align the decision makers by involving customs authorities in the standard development process and accelerate cooperation among governmental, business and inter-governmental actors in the earliest possible step prior to the design of a standard. A standard herein is ideally a coupling of content and linkages. This was shown and tested in the dissertation. Once the standard development process is better adjusted to governmental and business

customs-needs, a further step needs to be taken. An IS standard serves only as enabler of interactions once the standard is being institutionalized as a formal carrier of the content. Thus, adoption is a key factor. As described in Task 5.1 (see **Table 7.18**), B2G collaboration establishes once the participating organizations institutionalize and adopt the standard. The institutionalization starts within the organizations and triggers then the adoption process in the network.

9.3 Limitations

The underlying case study in this work is the source for analytical assessments and the construction of the procedure model. The assessment and comparison took place under the lens of export-triggered collaboration in three distinct networks that comprise to one case study. The case study is cross-sectoral which means that the observed characteristics are not industry-specific but customs relevant. Hence, quality, comprehensiveness, and completeness of the model relied on the quality of the cases. Quality of the cases is given through the number of observed organizations, individuals, their expertise in the subject, and the number and applicability of screened material. The long-term study and the assessment of three distinct networks result in applying both narrative and process approaches. The first one facilitates the assessment of organizations and individuals and their repertoire of legitimate stories and sources. The second one assesses the event-driven design of the procedure model based on the analysis of process steps and sub-steps in the reference process. Results are clearly documented and specified in detail. Still, the number of cases is limited to three cases. The cases were subject to research for a period of three years. Moreover, the number of observed stakeholders varied and restricted the assessment of the design elements of the B2G Procedure Model.

Further limitations in the dissertation result from the exclusion of financial implications in the observed case study. The decision to exclude financial aspects resulted from the observed cases. Those did not focus on inter-organizational financial trade activities nor assessed financial aspects in depth for each of the three cases. A finance-based analysis of data exchange, business processing, and collaboration efforts did not take place. Hence, the B2G Procedure Model lacks the financial aspects of collaboration formation. Finance-based research might reveal further impacts or limitations of standard-based collaboration formation. Furthermore, a business case of the procedure model and its financial implications on the observed B2G collaborations were not studied. Though the

procedure model is published herein and therefore cost-free, adoption and maintenance among other cost types are expected to occur.

In the case of customs, regulatory forces trigger the membership in B2G networks through their forming and stabilizing character. This role of regulatory forces does not necessarily similarly apply to other forms of B2G collaborations. Therefore, the observations and results in this dissertation do not allow to generalize the results to any B2G collaboration. However, a generalization is cautiously achievable under the lens of customs relevant collaboration that executes or originates in other geographies than the European Union.

9.4 Theoretical Contribution

The core theoretical contribution of the dissertation is the design, construction, and provision of a procedure model for B2G collaboration in customs management under the institutional lens. Herein, the institutional characteristics of social structures as depicted by Scott (2001) are the baseline for the model. Five areas of theoretical contributions are apparent. In the following, each of them is further described.

Firstly, the dissertation shows that a design-based approach is applicable to an inter-organizational collaboration scenario. With the design, development, and construction of the B2G Procedure Model the dissertation applies design principles that are based on design science research (cf. Peffers, Tuunanen, Rothenberger, & Chatterjee (2008), p. 47-48).

Secondly, the institution-based B2G Procedure Model applies the guidelines and recommendations provided by Scott in his work on institutional theory in network formation (cf. Scott (2001)). Scott provides AFII in a textual descriptive format (cf. Scott (2001), p. 84-85) and not in a formalized manner. Herein, the dissertation proposes a formalized manner of the AFII and extends the existing theoretical assessments. The dissertation applies Scott's analytical levels, structures them, and sets them into relation (cf. Scott (2001), p. 199). The analytical levels are organization, organizational population, and organizational field. References as outlined in **Table A.9.1** apply one or two levels of analysis within an organizational field but not an entire assessment of an organizational field. It provides guidelines and examples how to conduct institution-based collaboration analysis. Then, research that uses the B2G Procedure Model makes the analysis accessible and reusable for further research.

Thirdly, the B2G Procedure Model discloses institutional aspects of B2G collaboration for customs. It emphasizes the use of IS standards in a sense that they are clear, concise, and repeatable sequences of specifications and are made available to the audience. Ideally, governmental actors that are involved in customs give access to the specifications. The use of standards as proposed in the procedure model is voluntary however explicitly perceived as beneficial by the case study participants. Concerning organizational constructs, the dissertation applies a novel approach that allows the analysis of distinct constructs that are relevant to collaboration formation in B2G collaborations: business, governmental, and academic partners, as well as standardization bodies, trade and industrial associations. Moreover, it reveals organizational and institutional forces in B2G collaboration formation and discloses pairs of relationships. Institutional researchers will benefit from the extensive assessment of both organizational and institutional elements.

Fourthly, the dissertation exemplifies how to internalize institutional forces in organizations. With regard to the institutional characteristic of standards, the dissertation observes a potential transition from directives to standards and vice versa. The dissertation expands the research of institutional theory in IS research by studying standards as institutional carriers. So far, standards have not been assessed from an institutional perspective in IS research (see **Table A.9.1**). The dissertation points to a hybrid approach where standardization becomes a regulatory mandate but will be deployed individually by standard development organizations or software providers. If not directly regulated, standards are optional and therefore constrain the utility of the procedure model as prospected. Hereby, the dissertation points to the usefulness of IS standards frameworks for B2G purposes. An in-depth analysis of the implications on IS standards frameworks is still required.

Fifthly, the dissertation contributes to the initiation of institutional processes as introduced by Scott (cf. Scott (2001), p. 136-149). The establishment of the standard-enabled B2G collaboration is referred to as one institutional process. Under the macro lens, the term institutionalization describes the process by which organizational constructs agree and implement formal structures such as procedural routines and processes. Thus, organizational constructs have the capability to establish institutions and accommodate themselves to institutional behavior. More importantly, the process of institutionalization accelerates if organizational constructs are able to improve their competitive footprint and to cultivate institutional forces in their collaborative environment better than organizations that are not capable to respond timely enough to governed forces. A key argument for a pre-formatted collaboration initiation comes

from Scott (ibid., p. 133-134): the missing economic logic to form B2G collaborations. He argues that regardless of the economic impact of an actor in the collaboration, non-compliance with institutional forces will discontinue an actor's membership in the organizational field. Referring to design criteria for the determination of the organizational field, this work applied Scott's argument as follows (ibid., p. 136-137): unlike randomly collected resources and schemas, the organizational field constitutes by institutional forces, and has the character of active construction. In the underlying case, governmental constructs (European Community, national legislation) actively constructed the field of export through the enforcement of Modernized Customs Code. As Scott states, the inherited wish of regulatory authorities to exercise control requires an overarching governance framework that should be part of B2G collaborations (cf. Scott (2001), p. 140-142). However, as confirmed in the assessment of the procedure model, the coherence among actors from different levels and domains in reaching a common and collectively framed agreement is a critical and essential activity in this model. The therein-introduced softening factor and the need for clarification stewards assess the impact on to-be-standardized B2G collaborations if not successfully achieved. For simplification reasons, research in this dissertation excluded the concept of authority and power. It points hereby to further tests and research on applicability of the procedure model under the lens of political influences. Referring to the impact of international and inter-governmental organizations, this work follows Scott's observation on the determination of influence inter-governmental actors have (ibid., p. 136). Inter-governmental actors that took part in the study are WCO and UNECE that are accountable for institutional influence similar to regulatory authorities (cf. United Nations (2005)).

To sum up, the dissertation demonstrated a way to conduct institution-based IS research. The institution-based Analytical Framework II of Scott (2001, 2008) has not been depicted so far in a structured format. Furthermore, the usefulness of the Analytical Framework II of Scott has been applied in the dissertation not only on the level of organizational populations, but on the level of an organizational field. The findings in the dissertation strengthen the argumentation of Scott for an institution-based collaboration formation (Scott (2001)). The dissertation explores novel viewpoints on the role of institutional carriers in IS-enabled collaboration formation. Herein, it connects institutional theory with IS research. It offers an approach to close the gap of regulatory requirements in IS-driven inter-organizational collaboration and to close the gap of implementing IS-driven requirements to facilitate inter-organizational collaboration.

9.5 Contribution to Practitioners

This work serves as an entry point to practitioners that work in the field of standards, standardization and inter-organizational collaboration on an international basis. Due to the nature of the empirical research, the outcome is not limited to a specific country or industry. It was the objective of the work to provide applicability of the procedure model regardless of country, industry or type an organization is involved in.

The dissertation contributes to the need of organizations to find a systematic approach in entering foreign markets and ensuring regulatory compliance end-to-end. The dissertation revealed an approach in coping with institutional forces such as regulations and institutional constructs such as governmental actors. Furthermore, it outlines through the description of essential tasks and activities a guideline that organizations are able to understand and apply. It is expected that also small and medium-sized enterprises will benefit from the disclosed customs-related content such as processes and forms. The B2GPM hereby could serve as a template to organizations that are expanding the operational activities to export. Export managers and trade departments that are hesitant in pursuing new trade opportunities due to increasing demand in providing a number of data and documents to governmental authorities get access to three use cases and most relevant data and documents. Multi-national companies benefit from pre-formatted and bundled transaction details. Customs organizations receive a guideline that helps to synchronize local and foreign customs-relevant activities for cross-border trade. The stakeholders are prepared to initiate and develop their collaboration by applying the tasks and activities of the B2G Procedure Model.

The design approach that was taken grounded in contributions from governmental and business actors and a longitudinal case study. It digested and considered design considerations and elements from a practitioner's point of view. Thus, it is addressing practitioners'' needs. The B2G Procedure Model itself is through the publication of the dissertation made available to the practitioners. Practitioners' regardless their business or governmental role will benefit from the pre-formatted content in form of activities, tasks, role descriptions, resources, and necessary conditions. IS engineers that are in charge of customs applications will benefit from the analytical approach for electronic customs applications and the modeling artifacts of this dissertation. Beneficiaries in the legislation field are pointed to key elements of customs management sources on a European level and potential conflicts in legislation modeling. The B2G Procedure Model addresses most relevant standardization needs on data, content, and business process level to standardization organizations.

The accessibility and comprehensiveness of the B2G Procedure Model allows that practitioners that are located in any of the observed networks are able to execute it right away. Furthermore, practitioners in other customs-relevant collaborations are able to apply the model as well. The model is not only accessible but also adaptable. Activities and the outputs of tasks guide practitioners to updates and required reviews of sources to maintain and update the model consequently. International, not case study related observations were taken into consideration in the thoroughly conducted evaluation. The evaluation results equip practitioners with strategic, operational, and IS relevant arguments for IS-based customs management.

To sum up, the dissertation proved its relevance to the work of practitioners. It explores novel viewpoints on collaboration formation by including governmental actors. Moreover, it describes in a systematic, semi-structured format roles and activities of actors. The documentation is presented in an a-theoretical manner. The implication of this approach is that practitioners can follow the procedure model, tasks, and activities without knowledge of any theoretical assumptions and constructs. Through this dissertation, the documentation is made accessible to the practitioners for further use and consideration.

9.6 Implications for Future Research

The results of this dissertation points to the future research. A strong focus of future research should be on collaboration and standardization engineering.

Concerning collaboration engineering, the outcome of the dissertation, the B2G Procedure Model, contributes to the research of inter-organizational network formation and network management by adding an institution-based network model. It needs to be asked if the B2G Procedure Model serves other than the observed customs organizations. The institution-based network model consists next to organizational constructs also of institutional forces and a structured approach to compose the network. An important future research topic concerns the question that mechanisms are needed or not to maintain, update, and publish institutional forces. The B2G Procedure Model extends the typology of networks as proposed by Hess (2002) and introduces a form of ‘governed collaboration’.

It is recommended to further test the B2G Procedure Model from distinct perspectives. Firstly, a business case driven study should be carried out and assess the implications of the use of the B2G Procedure Model on adoption, maintenance and its impact on

existing effforts to manage a B2G collaboration from an organization's point of view. With the growing strategic importance of applying a standard-enabled model, actors should now weigh the return on investment of the use of the B2GPM against administrative, operational and strategic efforts. Secondly, it is recommended to gain more experience and insights in practicability and usability. Further research will reveal if the roles as addressed in B2G Procedure Model are sufficient, adequate, and specified enough. Consequently, it needs to be investigated which of the existing roles is appropriate to maintain and disseminate the B2G Procedure Model. A strong focus for further research would be on the assessment of governmental roles in the collaboration and their contribution to B2G-based collaboration engineering. Concerning the trigger of collaboration formation the question arises if the institutional aspect of collaboration formation is a customs-specific phenomenon or typical for any B2G collaboration. The documented and designed tasks and activities will contribute to the evolvement of the model. Hereby, the model should be applied for further testing and reviews of the completeness and categorization of constructional elements. It would be required to investigate further the usability and establishment of the model in other customs-based collaboration scenarios than introduced. The focus on inter-organizational network formation addresses distinct levels of inter-organizational analysis similar to the distinct levels addressed in business engineering research (Winter (2003); Österle (1995)). Furthermore, it would be useful to understand the importance of legislation modeling in institution-based B2G collaboration formation.

In the field of IS standards research, the case study analysis and the introduction of standard-enabled collaboration point to the assessment of vertical standards consolidation and convergence opportunities. Despite the efforts of standards evangelists of SDOs, research contributions to this approach and case studies based on the use of standards are few. The results of this dissertation act as well as reference for further standard-enabled B2G relevant case studies. Would be the role of IS standards in other than customs-related collaboration preparation similar to the observed role as medium type? The overarching concept of the B2G Procedure Model provides an appropriate frame to identify standardized content and subscription services within the development and deployment of medium types and expected content. An important question relates to that latter observation and concerns the research on adoption and diffusion of medium types. The institutional aspect of IS standards is essential for the modeling and design of the B2G Procedure Model. How will the institutional aspect be considered by standard development organizations? Are there differences on the institutionalization if the collaboration is industry oriented? This work provides access to a number of potential use cases in B2G for standard-enabled applications. One field

of application is the design of standard-based certification services such as the AEO assessment and the design of the Single European Authorization. The empowerment of organizations in the deployment of AEO or the Single European Authorization eases to the internalization of procedural routines and is tightly linked to the adoption of standards. Herein, standards once successfully institutionalized foster inter-organizational collaboration. Otherwise, collaboration is hampered and stuck. Standards in this context are part of IT-enabled transformation. In this role, they are one of other potential transmitters that transport regulative forces. A second field of application relates to the field of Very Large Business Application (VLBA) design and implementation. Introductory studies are made by Grabski (cf. Grabski et al. (2007), p. 259-261) and Rautenstrauch (cf. Rautenstrauch (2007), p. 3-5). B2G governed application design as proposed by the MASP initiative will be based on non-single vendor based, but chained applications. Following the argument of VLBA research, standard-enabled inter-organizational business applications hook into the process and system layers of a VLBA (cf. Rautenstrauch (2007), p. 3-5).

Annex

Table A.9.1: Institutional theory in use in IS Research

Year and References of published studies that use institutional theory in IS research	
2008	Akesson, M., Skalen, P., & Edvardsson, B. (2008). E-Government and Service Orientation: Gaps between Theory and Practice. *International Journal of Public Sector Management, 21*(1), 74-92.
	Bunduchi, R., Graham, I., Smart, A., & Williams, R. (2008). Homogeneity and Heterogeneity in Information Technology Private Standard Settings – The Institutional Account. *Technology Analysis & Strategic Management, 20*(4), 389-407.
	Hood, C., & Margetts, Z. (2008). *The Tools of Government in the Digital Age* (Vol. Second Edition): Palgrave Macmillan.
	Hyder, A. S., & Abraha, D. (2008). Institutional Factors and Strategic Alliances in Eastern and Central Europe. *Baltic Journal of Management, 3*(3), 289-308.
	Luna-Reyes, L. F., Gil-Garcia, J. R., & Estrada-Marroquin, M. (2008). The Impact of Institutions on Interorganizational IT Projects in the Mexican Federal Government. *International Journal of Electronic Government Research, 4*(2), 27-42.
	Orsucci, F. F., & Sala, N. (2008). *Reflexing Interfaces: The Complex Coevolution of Information Technology Ecosystems*: Information Science Reference.
	Reimers, K., & Li, M. (2008). *Interaction of Technological and Institutional Change in the Development of an Electronic Commerce System in China's Pharmaceutical Distribution Chain - A Transaction Cost Perspective.* Paper presented at the Conference on Health Informatics (HEALTHINF), Funchal, Portugal.
	Rowlands, B. (2008). *Institutional Aspects of Systems Development.* Paper presented at the 19th Australasian Conference on Information Systems, Christchurch.
	Shi, W., Shambare, N., & Wang, J. (2008). The Adoption of Internet Banking: An Institutional Theory Perspective. *Journal of Financial Services Marketing, 12*(4), 272-286.
2007	Dixit, A. (January 31, 2007). *Lawlessness and Economics: Alternative Institutions of Economic Governance.* Paper presented at the McGee Lecture, Vanderbilt University.
	Frößler, F. R., B., Higgins, A., Klein, S., Tan, Y.H. . (2007). *Inter-Organizational Network Formation and Sense-Making: Initiation and Management of Public-Private Collaboration.* Paper presented at the 20th Bled eConference eMergence: Merging and Emerging Technologies, Processes, and Institutions, Bled / Slowenia.
	Guah, M. W. (2007). *Changing Healthcare Institutions with Large Information Technology Projects.* Paper presented at the IRMA, Vancouver, Canada.
	Hua, Q., Harta, P., & Cooke, D. (2007). The Role of External and Internal Influences on Information Systems Security – a Neo-Institutional Perspective. *The Journal of Strategic Information Systems, 16*(2), 153-172.
	Kshetri, N. (2007). Institutional Factors Affecting Offshore Business Process and Information Technology Outsourcing. *Journal of International Management, 13*(1), 38-56.
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	Shah, R., & Shin, H. (2007). Relationships among Information Technology, Inventory, and Profitability: An Investigation of Level Invariance using Sector Level Data. *Journal of Operations Management, 25*(4), 768-784.
	Sharma, A., Citurs, A., & Konsynski, B. (2007). *Strategic and Institutional Perspectives in the Adoption and Early Integration of Radio Frequency Identification.* Paper presented at the 40th Hawaii International Conference on System Sciences (HICSS), Hawaii, HI.
	Tempel, A., & Walgenbach, P. (2007). Global Standardization of Organizational Forms and Management Practices? What New Institutionalism and the Business-Systems Approach Can Learn from Each Other* (Vol. 44, pp. 1-24).
	Wang, J., & Lee, C. (2007). Global Production Networks and Local Institution Building:

	The Development of the Information-Technology Industry in Suzhou, China. *Environment and Planning A, 39*(8), 1873-1888.
	Wang, P., & Swanson, E. B. (2007). Launching Professional Services Automation: Institutional Entrepreneurship for Information Technology Innovations *Information and Organization, 17*(2), 59-88.
2006	Benders, J., Batenburg, R., & van der Blonk, H. (2006). Sticking to Standards; Technical and other Isomorphic Pressures in Deploying ERP-Systems. *Information & Management, 43*, 194-203.
	Graham, I., Pollock, N., Smart, A., & Williams, R. (2006). Institutionalisation Of E-Business Standards. *MIS Quarterly, 30*(Special Issue Workshop), 1-9.
	Hu, Q., & Quan, J. (2006). The Institutionalization of IT Budgeting: Empirical Evidence from the Financial Sector. *Information Resources Management Journal, 19*(1), 84-97.
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	Salmeron, J., & Bueno, S. (2006). An Information Technologies and Information Systems Industry-based Classification in Small and Medium-sized Enterprises: An Institutional View *European Journal of Operational Research, 173*(3), 1012-1025.
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	Siu, W.-s., Lin, T., Fang, W., & Liu, Z.-C. (2006). An institutional analysis of the new product development process of small and medium enterprises (SMEs) in China, Hong Kong and Taiwan. *Industrial Marketing Management, 35*(3), 323-335.
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2005	Bandiera, O., Barankay, I., & Rasul, I. (2005). Cooperation in Collective Action. *Economics of Transition Special Issue: Symposium on Institutions and economic performance*, 1-29.
	Jayachandran, S., Sharma, S., Kaufman, P., & Raman, P. (2005). The Role of Relational Information Processes and Technology Use in Customer Relationship Management. *Journal of Marketing, 69*(4), 177-192.
	Lynggaard, K. (2005, March 31st - April 2nd 2005). *The Institutional Construction of a Policy Field: Illustrations from the Common Agricultural Policy.* Paper presented at the Biennial Conference of the European Union Studies Association, Austin, Texas.
	Matutinovíc, I. (2005). The Microeconomic Foundations of Business Cycles: From Institutions to Autocatalytic Networks. *Journal of Economic Issues, 39*(4), 867-898.
	Mignerat, M., & Rivard, S. (2005). *Positioning the Institutional Perspective in Information Technology Research.* Paper presented at the ASC, Toronto, Ontario.
	Peng, M. W., & Zhou, J. Q. (2005). How Network Strategies and Institutional Transitions Evolve in Asia. *Asia Pacific Journal of Management, 22*, 321-336.
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	Sawyer, S., Wigand, R. T., & Crowston, K. (2005). Redefining Access: Uses and Roles of Information and Communication Technologies in the US Residential Real Estate Industry from 1995 to 2005. *Journal of Information Technology, 20*, 213-223.
	Schillewaert, N., Ahearne, M. J., Frambach, R. T., & Moenaert, R. K. (2005). The Adoption of Information Technology in the Sales Force *Industrial Marketing Management, 34*(4), 323-336.
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	Wareham, J., Rai, A., & Pickering, G. (2005). Standardization in Vertical Industries: An Institutional Analysis of XML-Based Standards Infusion in Electricity Markets. *Electronic Markets, Vol. 15*(4), pp. 323-334.
2004	Bada, A. O., Aniebonam, M. C., & Owei, V. (2004). Institutional pressures as sources of improvisations: A case study from a developing country context. Journal of Global Information Technology Management, 7(3), 27.
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2000	Avgerou, C. (2000). IT and organizational change: An institutionalist perspective. Information Technology & People, 13(4), 234.
1999	Damsgaard, J., & Scheepers, R. (1999). Power, influence and intranet implementation A safari of south african organizations. Information Technology & People, 12(4), 333.
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1998	Jarvenpaa, L, S., & Leidner, E, D. (1998). An information company in mexico extending the resource-based view of the firm to a developing country context. Information Systems Research, 9(4), 342.
1997	Barley, S. R., & Tolbert, P. S. (1997). Institutionalization and structuration: Studying the links between action and institution. Organization Studies (Walter De Gruyter GmbH & Co.KG.), 18(1), 93.
	Premkumar, G., K. Ramamurthy, and M. Crum. (1997). Determinants of EDI Adoption in the Transportation Industry. European Journal of Information Systems, 6, 107-121.
1996	Boudreau, Marie-Claude, & Robey, Daniel. (1996). Coping with contradictions in business process re-engineering. Information Technology & People, 9(4), 40.

Table A.9.2: Commonly applied legislation in trade and customs

International conventions	
	International Convention on the Simplification and Harmonization of Customs Procedures (henceforth Revised Kyoto Convention), entered into force February 2006, consisting of Kyoto ICT Guidelines, SAFE Framework of Standards and WCO Customs Data Model WTO Agreement on Pre-shipment Inspection (PSI), OJ 1994 No. L 336, p. 138.
European Union related supranational law	
	Article 300 (7) European Community (EC) regulates that treaty agreements are binding on the institutions of the Community and on Member States. Article 23 EC Treaty regulates that the European Community (or Union) is a customs union Article 133 EC Treaty coordinates the Community Customs Code [EEC-2913/92], Council Regulation (EEC) No. 2913/92. It encompasses regulations and agreements necessary for 'the achievement of uniformity in measures of liberalization' or 'to protect trade'. The Community Customs Code is complemented by Amendment OJ 2005 No. L 117, p.13 that regulates electronic data exchange, pre-arrival and departure declaration, common risk management and Authorized Economic Operator accreditation procedures Draft modernized customs code TAXUD/458/2004 Rev. 4 that is seen as legislative pillar of e-Customs [EEC-2454/93] Community Customs Code Implementing Provisions, Commission Regulation (EEC) No 2454/93 [SEAP-USRREQ] User requirements for the SEAP, Ref. ECIPSEAP-USRREQ-002 [SC-C28.400] The legal and market aspects of electronic signatures, Study for the European Commission – DG Information Society, Service Contract Nr. C 28.400 Electronic Customs Multi-Annual Strategic Plan (MASP), TAXUD/477/2004 – Rev. 7. The MASP steers the activities of executing the Community Customs Code by governmental institutions. Community provisions or guidelines as one result of adopting recommendations of WCO, for example (See Annex 38 CCIP in relation to codes and Art. 569 CCIP and guidelines in OJ 2001 No. C 269, p. 41 in relation to professional equipment).
EU Member States specific national laws with general applicability	
	Applying the Community Customs Code (CC) 19 on the basis of Art. 26, 95 and 133 EC Treaty, since 1 January 1994 (Art. 1 sentence 1 Customs Code), this Customs Code has been the general customs law in the EC and is uniformly applicable in all Member States.
National laws	
	Adding to listed regulations, national laws are encountered with e-commerce specific law if applicable, customs domain and customs procedure laws.

Table A.9.3: Sources of legislation and their contribution to present work

Publication	Contribution to present work
EUR-lex: Access to European Union Law (European Union (2008))	Prime source to access European law including legislation, case law and legislative proposals
Proposal for a Regulation of the European Parliament and of the Council laying down the Community Customs Code (Modernized Customs Code) (European Commission (2005c))	Supranational EU legislation proposal for electronic customs
Convergence by Cooperation in IT - The EU's Customs and Fiscalis Programmes (Kuiper (2007))	Structural elements of international, national, and supranational customs and tax legislation
EU Customs Law and International Law (Lux (2007))	Comparison of EU customs law and international law
Implementing Recommendations of the United States 9/11 Commission Act of 2007 (GovTrack.us. H.R. 1 -110th Congress (2007))	Prime source to access U.S. American law concerning trade and security measures
New United States Legal Requirements for 100% Cargo Scanning, the WCO Position (WCO (2008b))	WCO directives and conflicting legislation on federal level
Emerging Issues in European Customs Law (Wolffgang (2007))	Comparison of EU customs law and transposition to national law

Table A.9.4: IS standards frameworks in literature

Proposed frameworks in literature	Authors	IS standards applied
XML-based industrial standard for electronic commerce	(Li (2000))	BizTalk, CBL, cXML, IOTP, OAGIS, OCF, RETML
Business-to-Business e-Commerce Framework	(Dogac & Cingil (2001))	eCo, RosettaNet, BizTalk, eXML, MesChain
XML-based B2B interaction framework	(Medjahed, Benatallah, Bouguettaya, Ngu, & Elmagarmid (2003))	eCo, RosettaNet, BizTalk, eXML, ebXML
e-business framework	(Nurmilaakso & Kotinurmi (2004))	BPML, eXML, ebXML, OAGIS, papiNet, RosettaNet, cXBL, XPDL
XML-based e-Business framework	(Nurmilaakso et al. (2006))	BPEL, BPML, CIDX, eXML, ebXML, OAGIS, papiNet, PIDX, RosettaNet, UBL, xCBL, XPDL
e-Business stack	(Janner et al. (2006))	EDIFACT, RosettaNet, UN/CEFACT-Framework
Electronic Commerce platform	(Albrecht, Dean, & Hansen (2007))	ebXML, UBL

Table A.9.5: Business and Technology Standards Survey

This table is added as Excel Table for readability reasons. It is labeled Annex Table A-9-5 at the right hand corner of the table sheets and it is located after the Bibliography.

Table A.9.6: Open Development Process of UN/CEFACT in detail

ODP Steps	Scope, activities, and actors involved in ODP steps
ODP1: Project Proposal and Team Formation	o Drivers: Need for standard is recognized in one of the permanent groups o Chairman of a Permanent Group submits proposal to the Forum Management Group o Successfully accepted proposals initiate team formation process o Deliverables: Project Proposal, Call for Participation, Initial Contributions
ODP2: Business Requirements Specifications Development	o Standardizers: stakeholders and experts draft business requirements specification. Experts embrace industry experts, software developers, end-users, and implementers o Applying UN/CEFACT Modeling Methodology UMM, UML and the UN/CEFACT Business Requirements Specification o Deliverables: Business Requirements Specification Document
ODP3: Internal Draft Development	o Scope: ODP3 is relevant for standards other than IS standards o Internal Draft is prepared by Permanent Group that vote for internal draft submission o Deliverables: Internal Draft, Comments Log
ODP4: Internal Business Requirements Specification Review	o Requirements documents are circulated among Permanent Groups and comments are tracked o Internal draft requires final approval from initiating Permanent Group o Deliverables: Public Business Requirements Specification Draft, Comments Log
ODP5: Public Business Requirements Specification Review	o Public invitation is made by UNECE to subscribers, experts, and national heads of delegations to verify, comment and ask for necessary updates o Public invitations are made via website and access to the document o Optional: handover to TBG Group to assess industry specific requirements o Deliverables: Final Business Requirements Specification Draft, Comments Log
ODP6: Implementation verification	o Applies to others than IS standards
ODP7: Publication	o UNECE adds formal information such as copyright statement, modify headers and footers, modify formats to the final draft o UNECE publishes the result, so called publication, on the UNECE website o FMG notifies heads of delegations and subscribers o Deliverables: Publication through UNECE
ODP8: Maintenance	o Implementation stage where organizations apply and implement the publication or release o Comments of Permanent Groups could lead to a revision of the release and another ODP

Table A.9.7: Interview guidelines for semi-structured interviews

Pre-structured elements for the semi-structured interview		Explanatory notes
A	Organization related questions	
A.1	what is your role in the organization	
A.2	what is your organization's role	
A.3	what is the mission of the organization	
A.4	what is the range of standards your organization is dealing with	examples are process, message, interface, data related, please select or add if necessary
B	Viewpoints concerning standard development	
B.1	what is the role of the industry	
B.2	what is the role of the government in general and departments in particular	
B.3	what is the role of trade associations	
B.4	who is not involved in standardization	
B.5	who should be involved in standardization	
B.6	concerning the latter response, how do you rate the importance of these partners	5 very important, 4 important, 3 importance not applicable as cannot be influenced, 2 less important, 1 not important
B.7	who is participating in standardization process	
B.8	what is your definition of a standard	
B.9	how would you describe standard's evolvement	from the idea of creating a standard to deployment
B.10	who are the organizations that are involved in standardization to-date	
B.11	what are the key criteria for you to deal with a standards	why do you use or apply standards
C	Please rate the following	5 very important, 4 important, 3 importance not applicable as cannot be influenced, 2 less important, 1 not important
C.1	standard is a common good	
C.2	standard are a mean to integrate companies and organizations	
C.3	standard need to be open	for example they are free of charge, accessible
C.4	standards are proprietary provided by software providers	standards belong to software applications or are incorporated in the software

D	Viewpoints concerning publication and diffusion of standards	
D.1	who is responsible for publication of standards	
D.2	how are standards being adopted	
D.3	how would you define the overall purpose of a standard	
D.4	what are factors that limit standards use / adoption	
D.5	is there a difference of standards adoption from an industry point of view	
D.6	is there a difference of standards adoption from the size of a company	
D.7	what is key to make standards accessible to companies / organizations	
D.8	what are barriers to get standards adopted	
D.9	how would you describe the role of a standard if companies and organizations aims for joint business operations	
D.10	what is standard not to you	
D.11	what cannot be achieved by standards	
E.1	is a successful standard deployment based on the number of participants	
E.2	is a successful standard deployment based on the size of participants	
E.3	is a successful standard deployment based on the industry participants belong to	
E.4	how do you see standards in relation to inter-organizational systems	
F	Reflection	
F.1	additional points or comments	

Table A.9.8: List of interviewees

Type of organization		Role of interviewees	Location
1	Consulting	Standard expert	Canada
2	Consulting	Standard expert	UK
3	Government IT Governance	Standardizer	Belgium
4	Government IT Governance	Standardizer	Denmark
5	Government IT Governance	Standardizer	Germany
6	Government IT Governance	Standardizer	Germany
7	Government IT Governance	Standardizer	Denmark
8	Government IT Governance	Standardizer	The Netherlands
9	Inter-governmental institution	Consultant	Switzerland
10	Inter-governmental institution	Management	Switzerland
11	Inter-governmental institution	Standardizer	Austria
12	Software provider	Implementer	Denmark
13	Software provider	Implementer	Denmark
14	Software provider	Implementer	Switzerland
15	Software provider	Implementer	The Netherlands
16	Software provider	Standardizer	USA
17	Software provider	Standardizer	USA
18	Software provider	Standardizer	Germany
19	Software provider	Standardizer	USA

Table A.9.9: Transcription guidelines

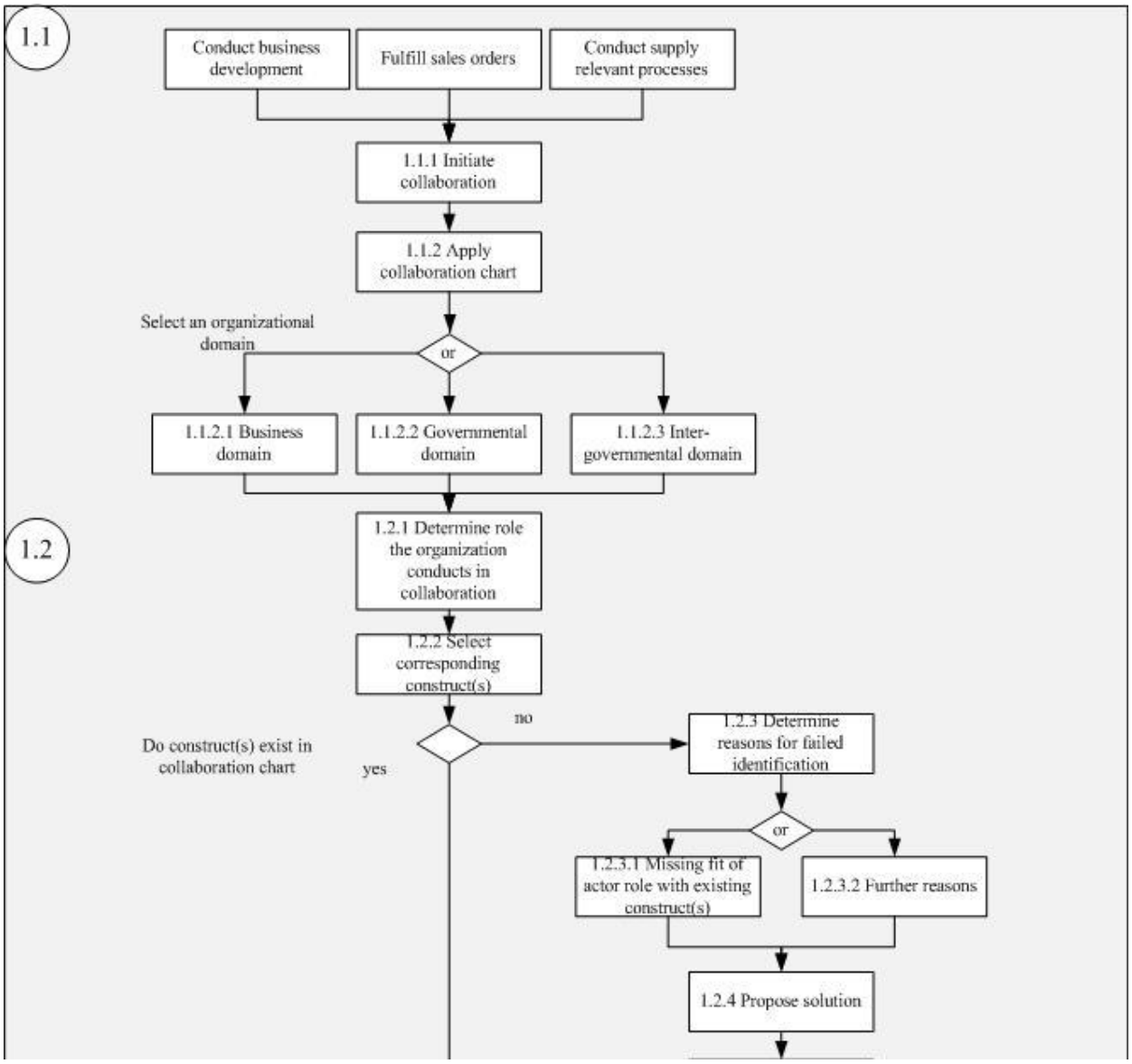
Pre-structured categories for transcribing case study input	
A.1	Overview of organization's involvement in export
A.2	Current situation
A.3	Procedural topics related to export and import
A.4	IS topics related to electronic export and import management
B	Stakeholder analysis - business and governmental partners
C	Export / import participants - business and governmental partners
D	Business process analysis
D.1	Purchase order process
D.2	Shipping process
D.3	Customs notification
D.4	Export declaration
D.5	Product loading
D.6	Transportation
D.7	Goods receipt
D.8	Statistics and VAT reporting
E	Key success factors for efficient trade and IS-enabled customs management
E.1	Reduce delivery time
E.2	Share information along supply and distribution chain
E.3	Facilitate operational activities
E.4	Diminish manual process steps
E.5	Reduce manual data transfer
E.6	Reduce multiple data checks
E.7	Enable standardized procedures
E.8	Enable standardized documents
E.9	Ease communication with governmental institutions
E.10	Access information
E.11	Improve competitive position
E.12	Allow new partners to enter the collaboration
E.13	Meet financial and business related success factors
F	To-be situation and improvement areas resulting from A to E

Table A.9.10: Anonymized list of case study participants

Key personnel		Participants role	Location
1	Customs and Tax1	EDP solutions	Denmark
2	Customs and Tax2	EDP solutions	Denmark
3	Customs and Tax3	Export management	Denmark
4	Customs and Tax4	Export management	Denmark
5	Customs and Tax5	AEO initiative	Denmark
6	Customs and Tax6	AEO initiative	Denmark
7	Customs and Tax7	Import management	Denmark
8	Customs and Tax8	Audit	Denmark
9	Customs and Tax9	Audit	Denmark
10	Customs and Tax10	Recipe control	Denmark
11	Customs and Tax11	VAT	Denmark
12	Customs and Tax12	Standardization	Denmark
13	Manufacturer1	Export management	Denmark
14	Manufacturer2	Export management	Denmark
15	Manufacturer3	Customer care	Denmark
16	Manufacturer4	Customer care	Denmark
17	IT Service provider1	Application maintenance	Denmark
18	IT Service provider2	Application maintenance	Denmark
19	Customer1	Import management	Russia
20	Customs and Tax1	Export management	The Netherlands
21	Customs and Tax2	Export management	The Netherlands
22	Manufacturer1	Customs management	The Netherlands
23	Manufacturer2	Application maintenance	The Netherlands
24	Manufacturer3	Application maintenance	The Netherlands
25	Manufacturer4	Supply chain management	The Netherlands
26	Certification broker1	Certificate provision	Switzerland
27	Carrier1	Carrier provision	Denmark
28	Carrier2	Carrier provision	The Netherlands
29	Manufacturer1	Customer care	Finland
30	Customs and Tax1	Customs management	Finland
31	Service provider	Process management	Finland
32	Customs1	Customs management	UK
33	Customs2	Customs management	USA
34	SDO1	Standardization	active in Belgium, Germany, Finland, and other locations
35	SDO2	Standardization	active in Switzerland and other locations
36	SDO3	Standardization	active in Finland and other locations
37	Inter-governmental1	Trade management	active in Switzerland and Russia
38	Trade association	Trade management	active in The Netherlands and other locations

Table A.9.11: List of unclassified interactions in B2G

This table is added as Excel Table for readability reasons. It is labeled Annex Table A-9-11 at the right hand corner of the table sheets and it is located after the Bibliography.


1.1
Conduct business development
Fulfill sales orders
Conduct supply relevant processes
1.1.1 Initiate collaboration
1.1.2 Apply collaboration chart
Select an organizational domain
or
1.1.2.1 Business domain
1.1.2.2 Governmental domain
1.1.2.3 Inter-governmental domain
1.2
1.2.1 Determine role the organization conducts in collaboration
1.2.2 Select corresponding construct(s)
Do construct(s) exist in collaboration chart
no
yes
1.2.3 Determine reasons for failed identification
or
1.2.3.1 Missing fit of actor role with existing construct(s)
1.2.3.2 Further reasons
1.2.4 Propose solution

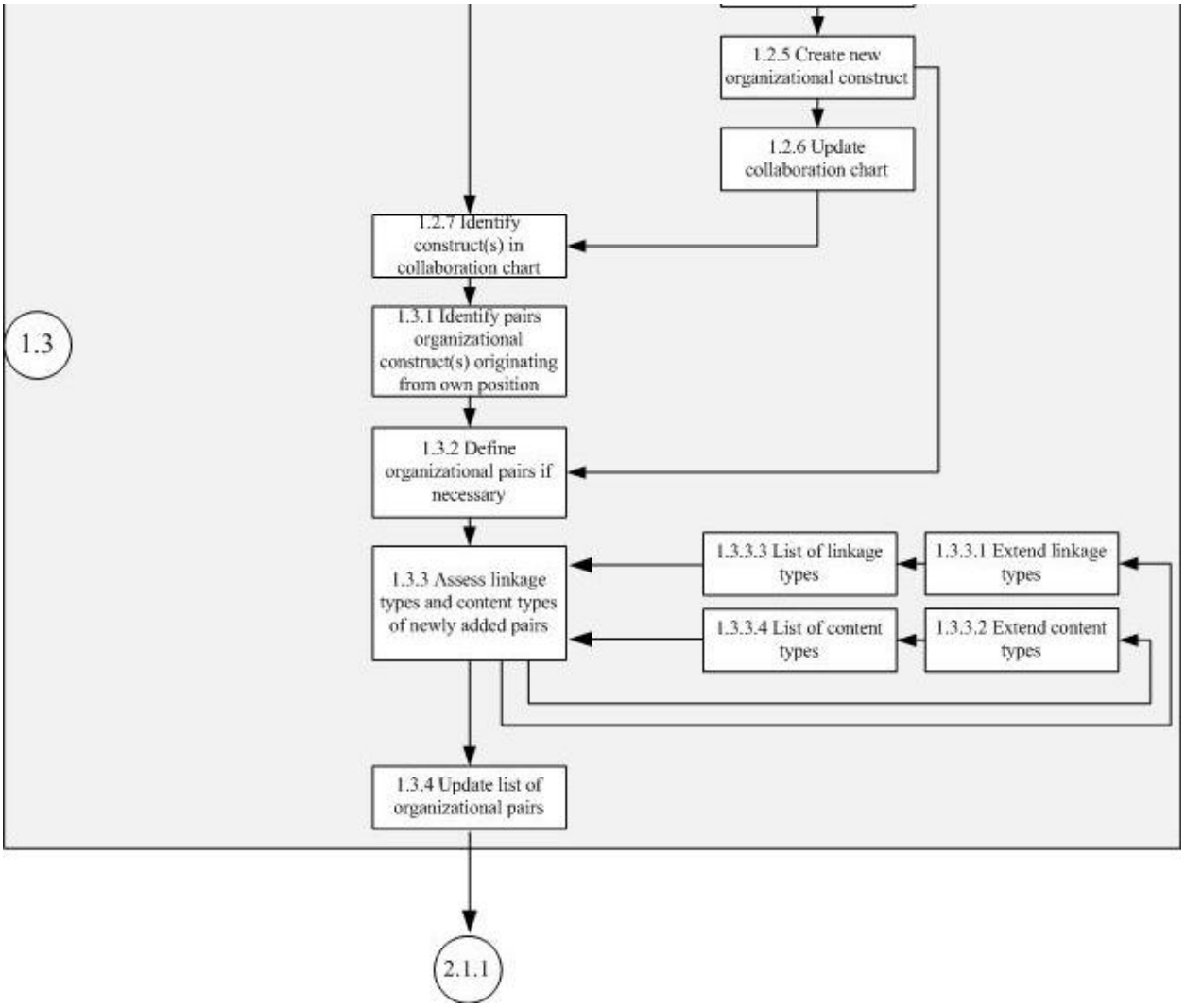
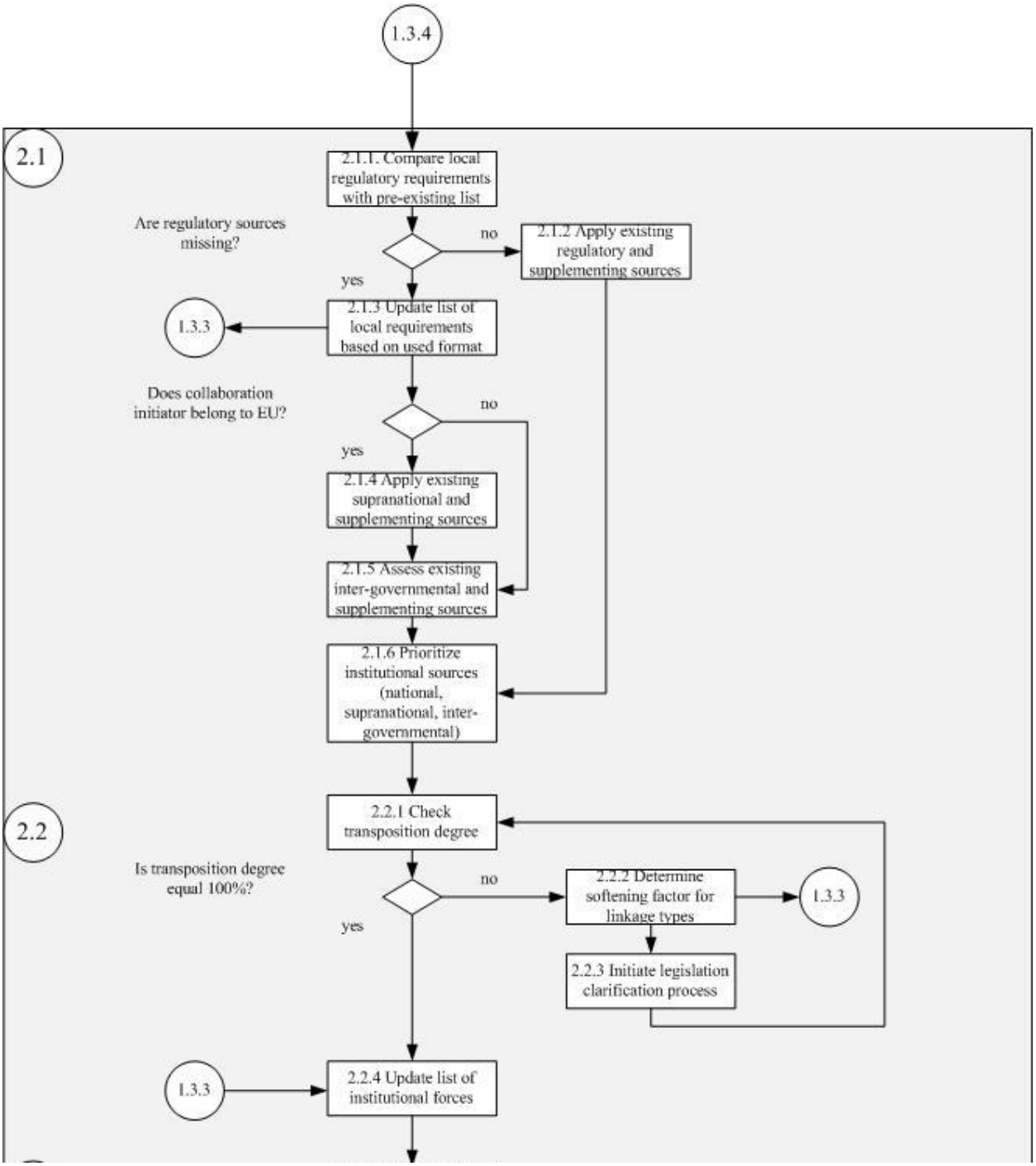


Figure A.9.1: Flowchart Part 1


1.3.4
2.1
2.1.1. Compare local regulatory requirements with pre-existing list
Are regulatory sources missing?
no
2.1.2 Apply existing regulatory and supplementing sources
yes
2.1.3 Update list of local requirements based on used format
1.3.3
Does collaboration initiator belong to EU?
no
yes
2.1.4 Apply existing supranational and supplementing sources
2.1.5 Assess existing inter-governmental and supplementing sources
2.1.6 Prioritize institutional sources (national, supranational, inter-governmental)
2.2
2.2.1 Check transposition degree
Is transposition degree equal 100%?
no
2.2.2 Determine softening factor for linkage types
1.3.3
yes
2.2.3 Initiate legislation clarification process
1.3.3
2.2.4 Update list of institutional forces

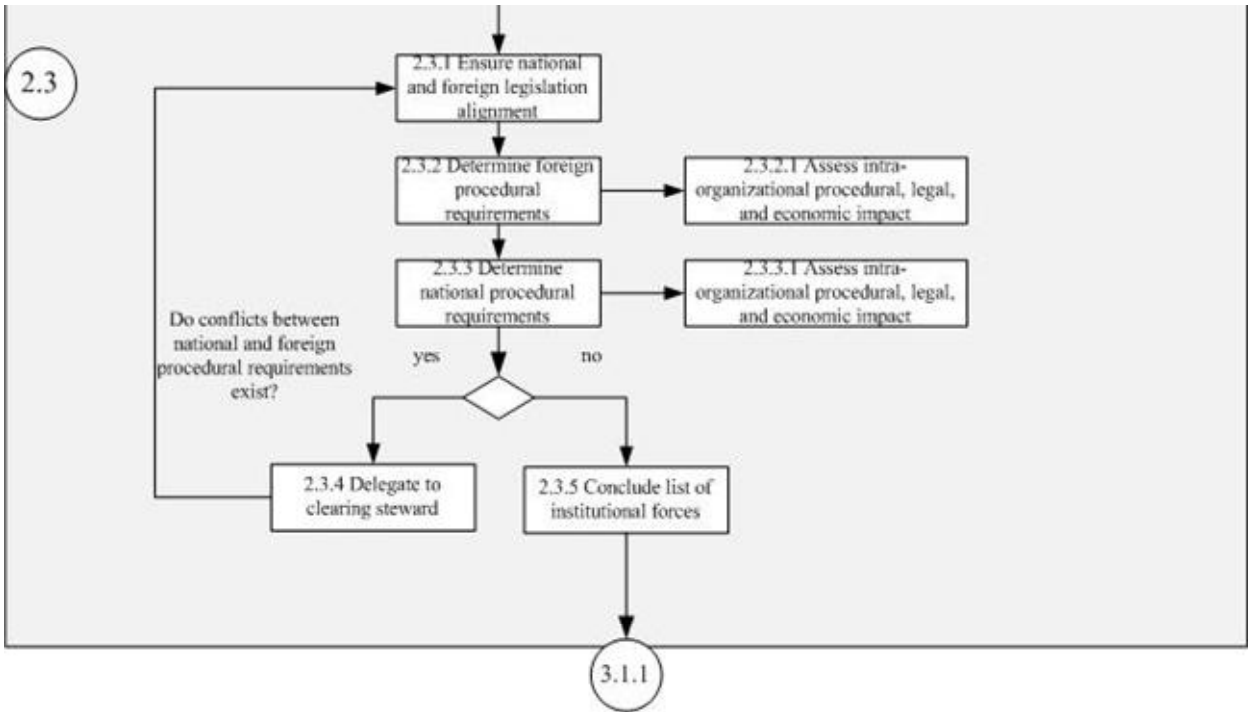
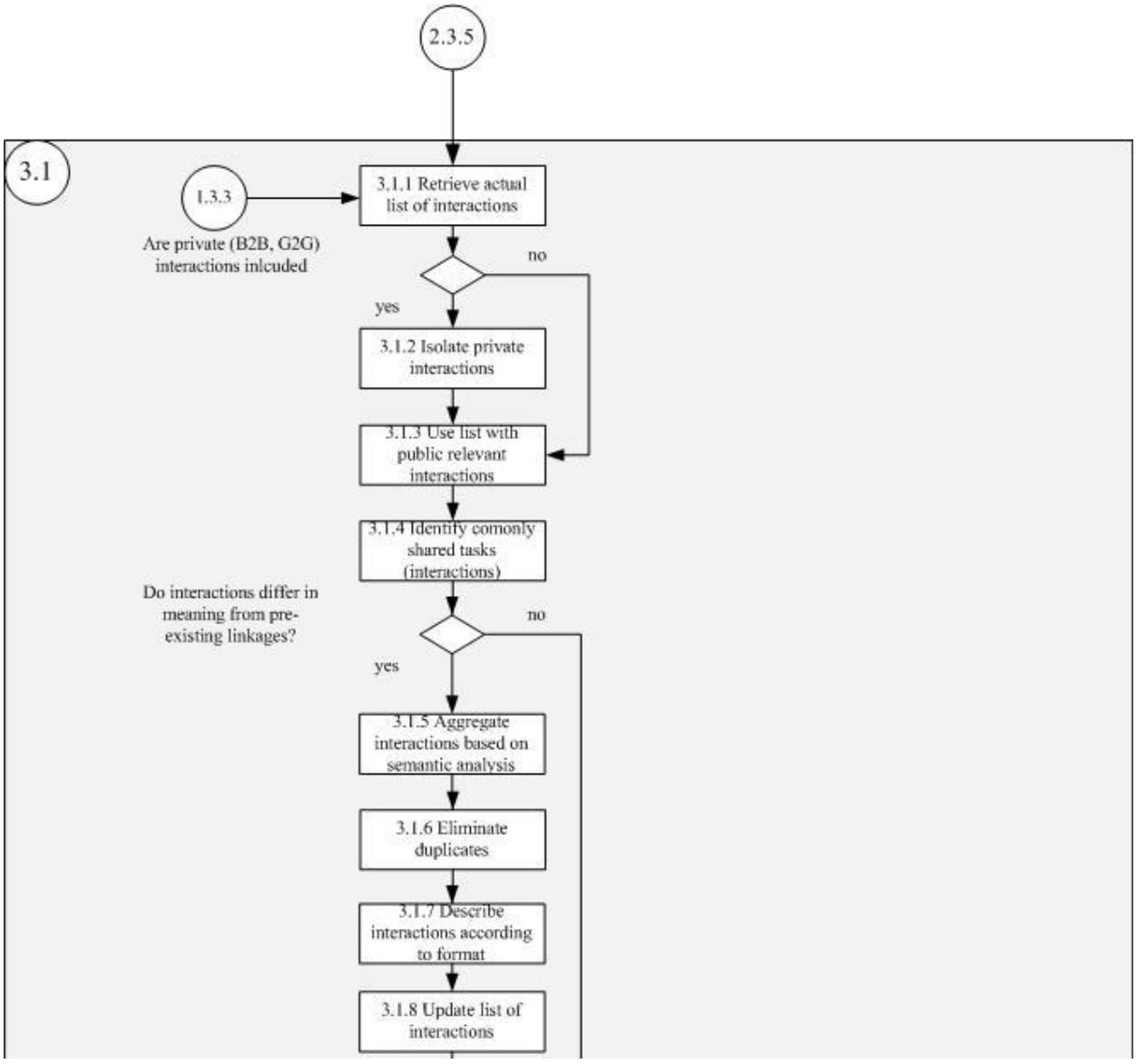


Figure A.9.2: Flowchart Part 2


2.3.5
3.1
1.3.3
3.1.1 Retrieve actual list of interactions
Are private (B2B, G2G) interactions inlcuded
no
yes
3.1.2 Isolate private interactions
3.1.3 Use list with public relevant interactions
3.1.4 Identify comonly shared tasks (interactions)
Do interactions differ in meaning from pre-existing linkages?
no
yes
3.1.5 Aggregate interactions based on semantic analysis
3.1.6 Eliminate duplicates
3.1.7 Describe interactions according to format
3.1.8 Update list of interactions

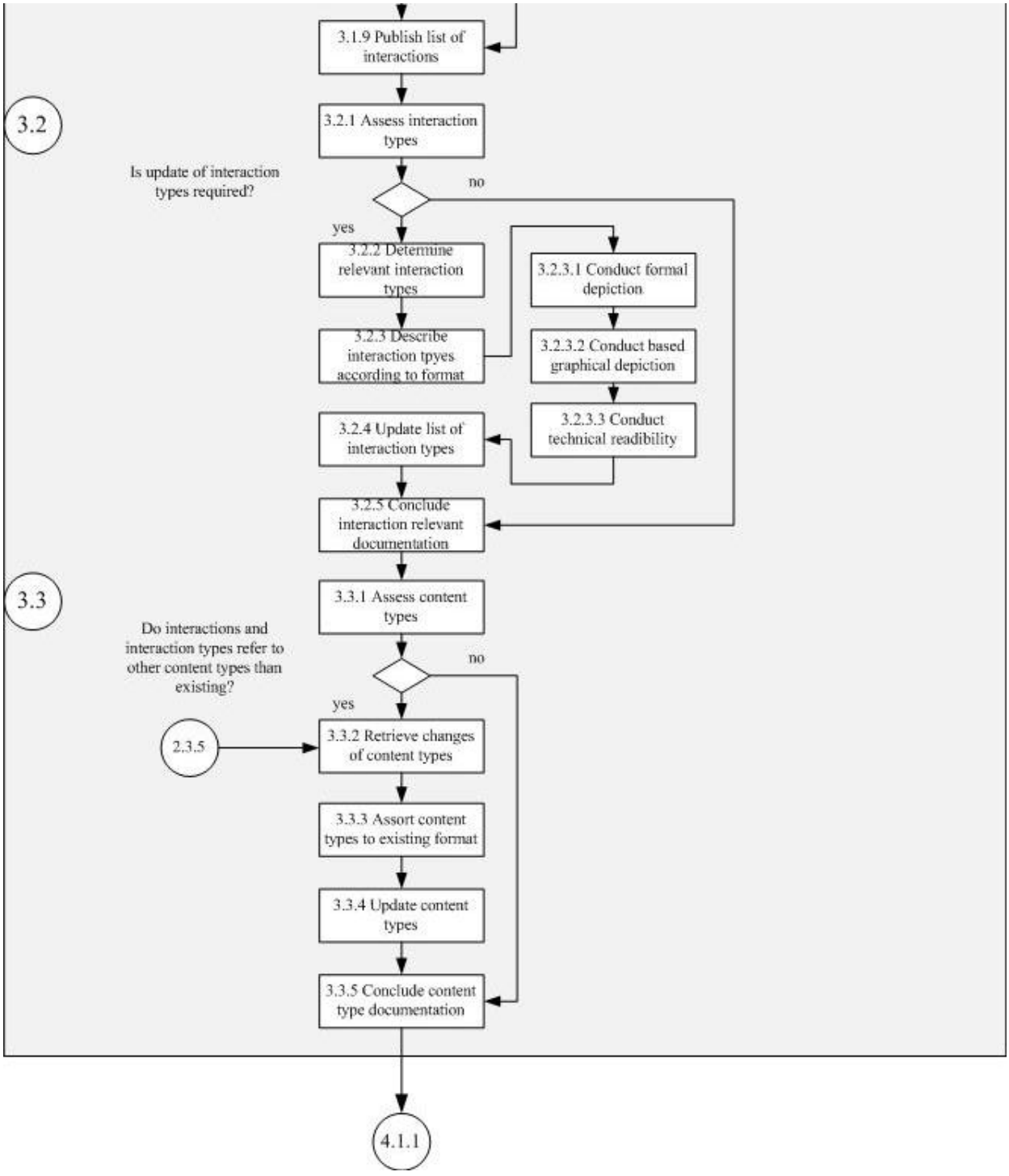
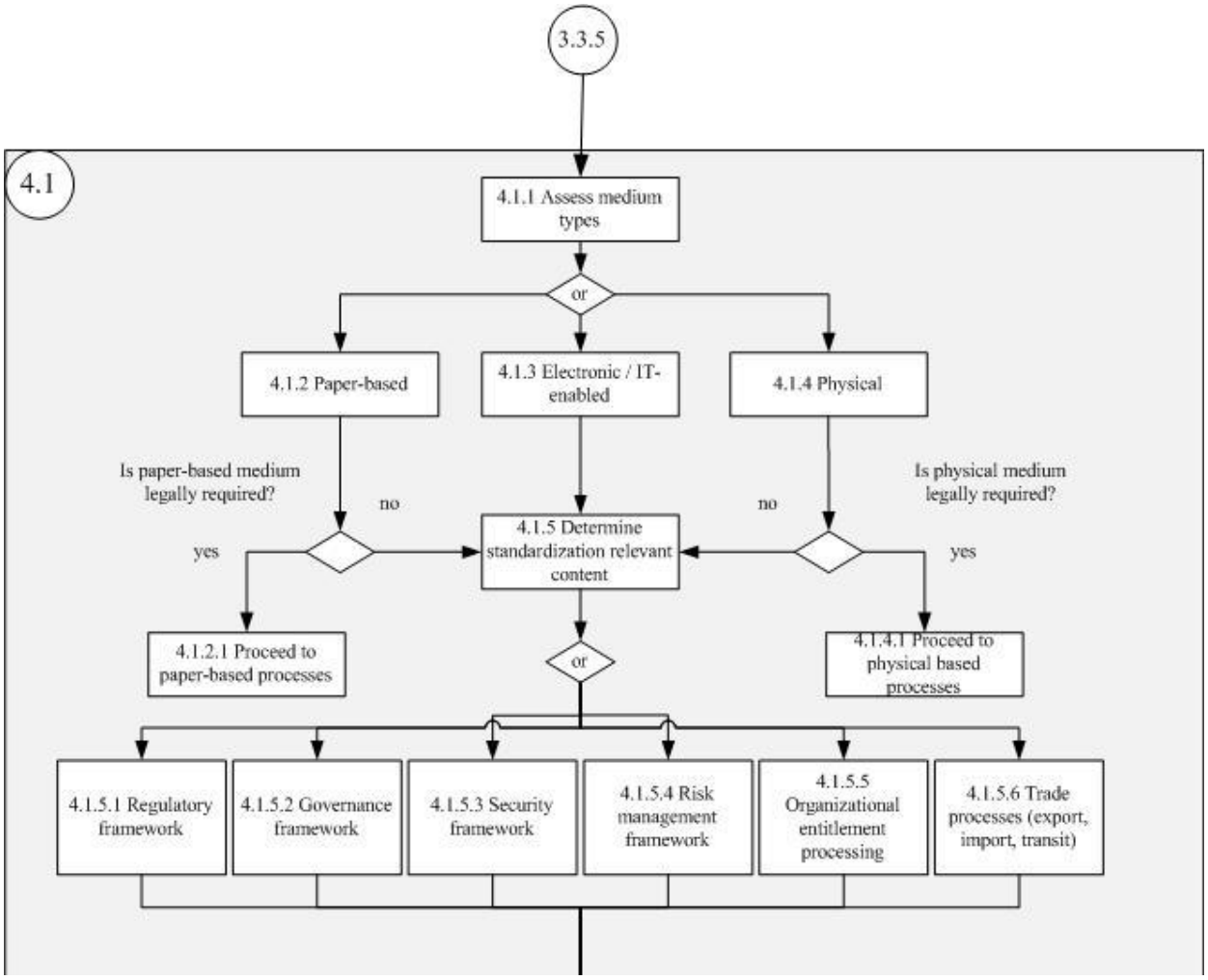


Figure A.9.3: Flowchart Part 3


3.3.5
4.1
4.1.1 Assess medium types
or
4.1.2 Paper-based
4.1.3 Electronic / IT-enabled
4.1.4 Physical
Is paper-based medium legally required?
no
yes
4.1.5 Determine standardization relevant content
no
Is physical medium legally required?
yes
4.1.2.1 Proceed to paper-based processes
or
4.1.4.1 Proceed to physical based processes
4.1.5.1 Regulatory framework
4.1.5.2 Governance framework
4.1.5.3 Security framework
4.1.5.4 Risk management framework
4.1.5.5 Organizational entitlement processing
4.1.5.6 Trade processes (export, import, transit)

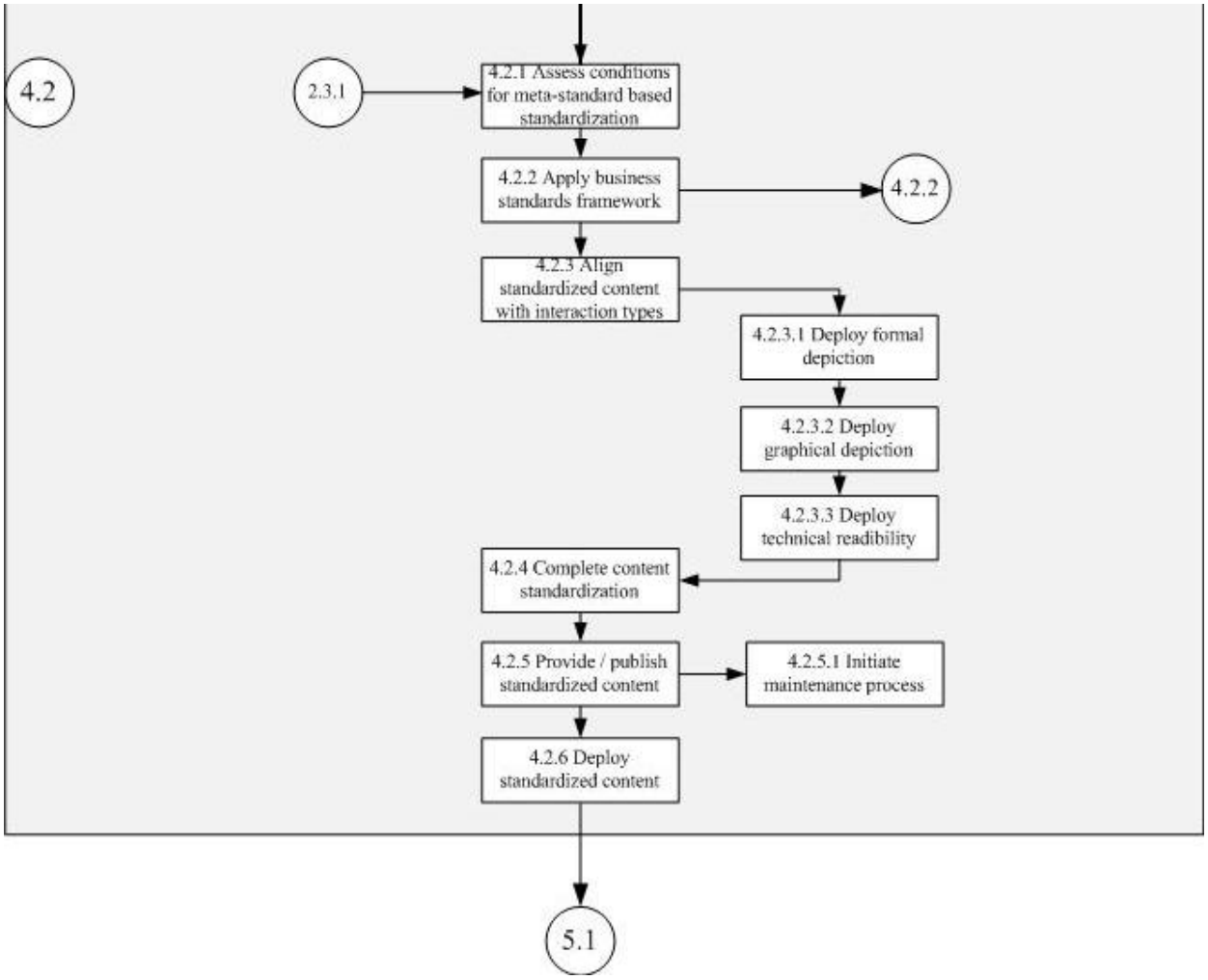


Figure A.9.4: Flowchart Part 4 – Tasks 4.1 and 4.2 excluding 4.2.2

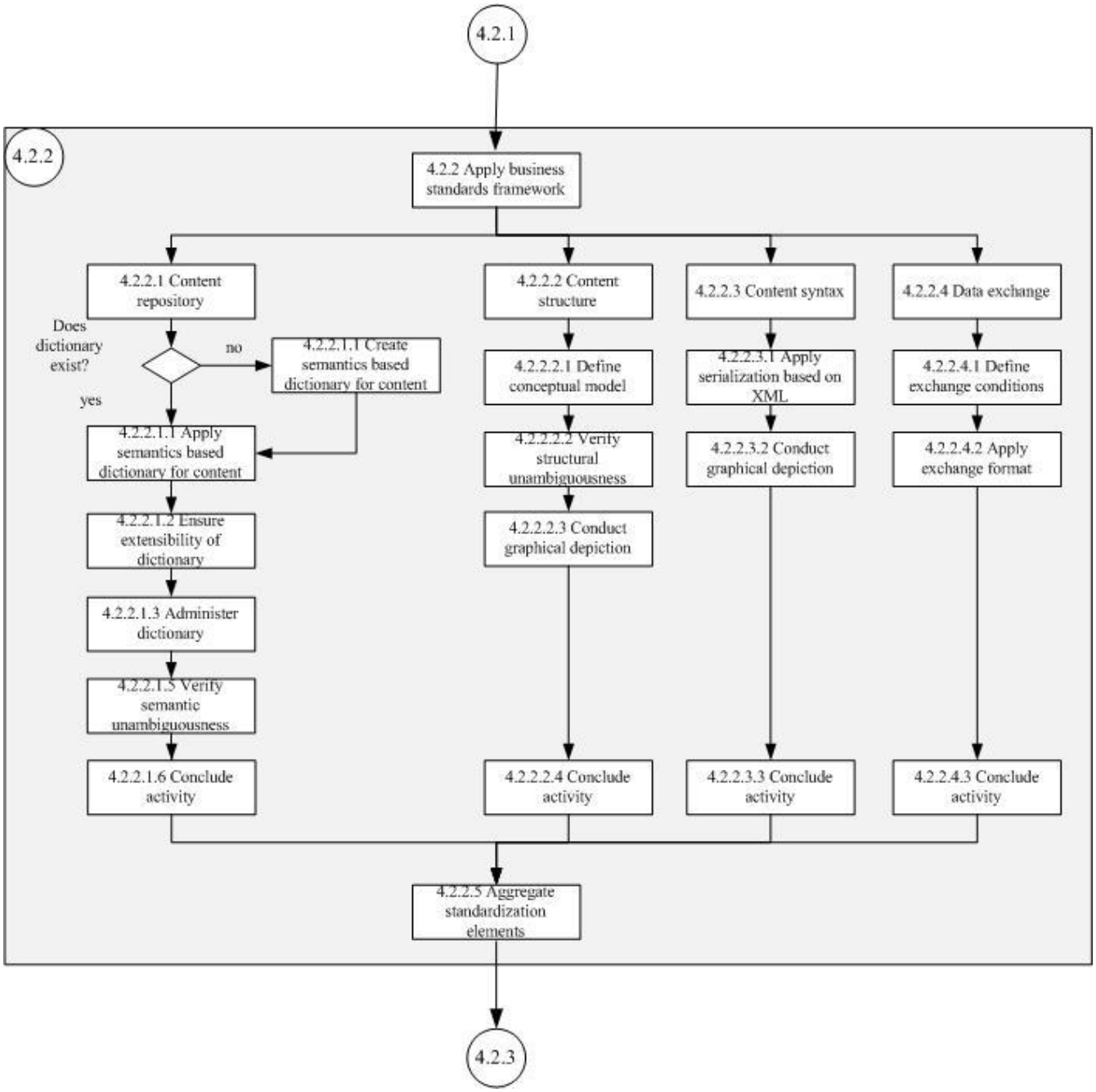
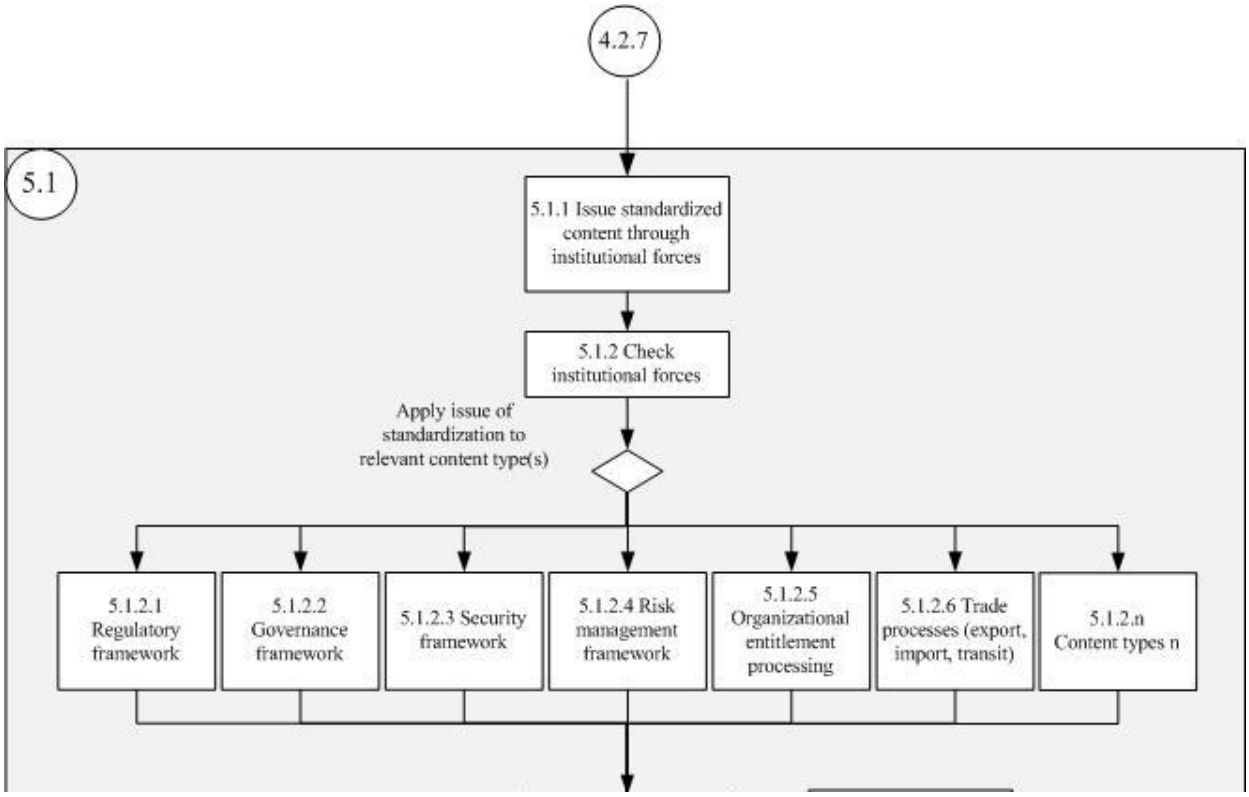


Figure A.9.5: Flowchart Part 4 – Task 4.2.2


4.2.7
5.1
5.1.1 Issue standardized content through institutional forces
5.1.2 Check institutional forces
Apply issue of standardization to relevant content type(s)
5.1.2.1 Regulatory framework
5.1.2.2 Governance framework
5.1.2.3 Security framework
5.1.2.4 Risk management framework
5.1.2.5 Organizational entitlement processing
5.1.2.6 Trade processes (export, import, transit)
5.1.2.n Content types n

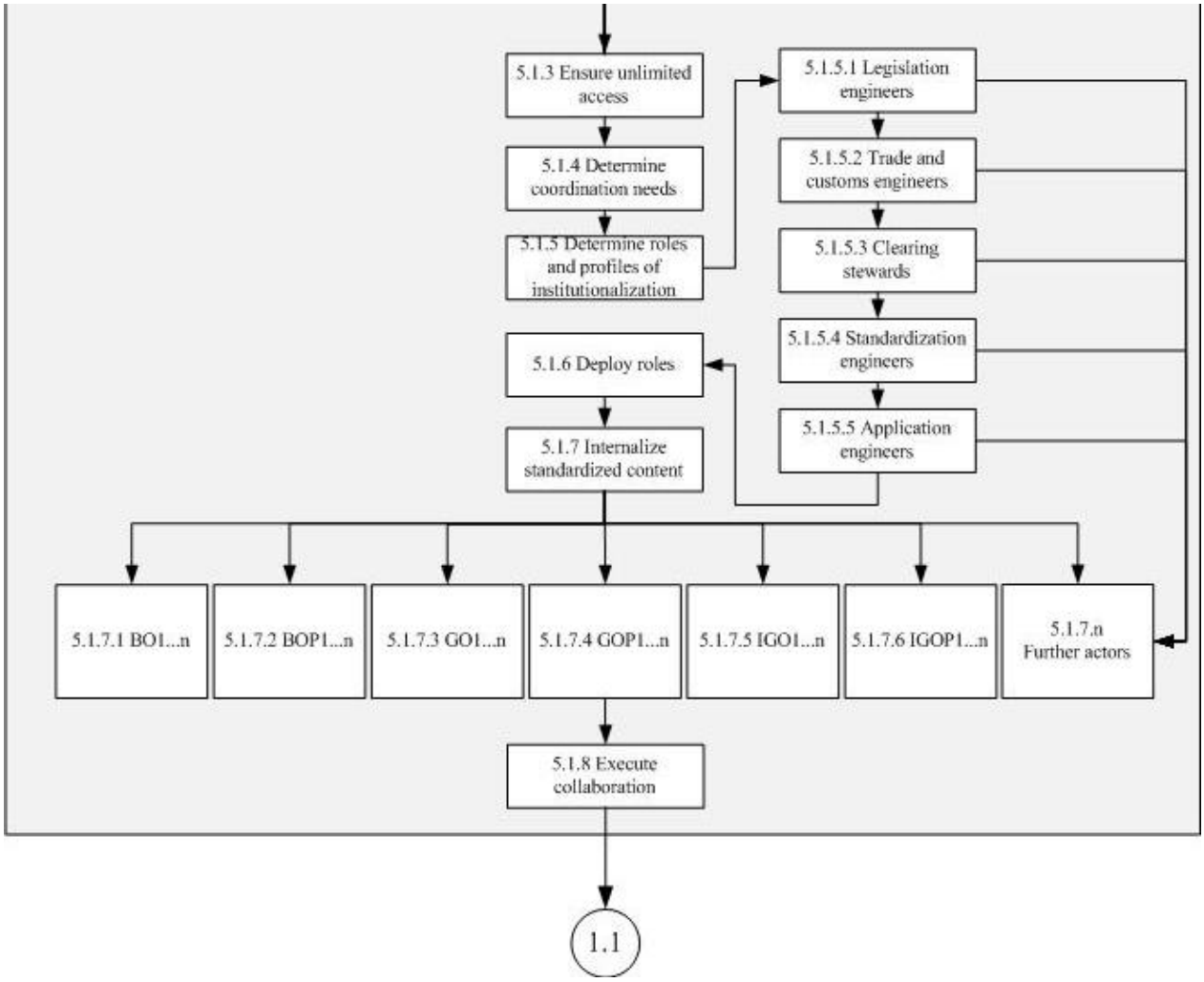


Figure A.9.6: Flowchart Part 5

Table A.9.12: Academic participants in the adoption-related workshop

Name of academic participants	Country of academic participants
Copenhagen Business School	Denmark
University of Münster	Germany
University College Dublin	Ireland
Vrije Universiteit Amsterdam	The Netherlands

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